

REPORT  
OF THE  
**Indian Tariff Board**  
REGARDING THE  
GRANT OF PROTECTION  
TO THE  
**PAPER AND PAPER PULP  
INDUSTRIES**



CALCUTTA : GOVERNMENT OF INDIA  
CENTRAL PUBLICATION BRANCH  
1925

Government of India Publications are obtainable from  
the Government of India Central Publication Branch,  
8, Hastings Street, Calcutta, and from the following Agents :—

#### EUROPE.

OFFICE OF THE HIGH COMMISSIONER FOR INDIA,  
42, GROSVENOR GARDENS, LONDON, S.W. 1.

Ernest Leroux, 28, Rue Bonaparte, Paris. | Otto Harrassowitz, Leipzig.  
Martinus Nijhoff, The Hague, Holland. | Friedländer und Sohn, Berlin.  
and all Book-sellers in the United Kingdom.

#### INDIA AND CEYLON.

##### Provincial Book Depots :

MADRAS :—Office of the Superintendent, Government Press, Mount Road, Madras.  
BOMBAY :—Office of the Manager, Government Central Press, Bombay.  
SIND :—Library attached to the Office of the Commissioner in Sind, Karachi.  
BENGAL :—Office of the Bengal Secretariat Book Depôt, Writers' Buildings, Room No. 1, Ground Floor, Calcutta.  
UNITED PROVINCES OF AGRA AND OUDH :—Office of the Superintendent of Government Press, United Provinces of Agra and Oudh, Allahabad.  
PUNJAB :—Office of the Government of Punjab, Lahore.  
BURMA :—Office of the Superintendent, Government Printing, Burma, Rangoon.  
CENTRAL PROVINCES AND BERAR :—Office of the Central Provinces Secretariat, Nagpur.  
ASSAM :—Office of the Superintendent, Assam Secretariat Press.  
BIHAR AND ORISSA :—Office of the Superintendent, Government Printing, Bihar and Orissa, P. O. Gulzarbagh, Patna.  
COORG :—Office of the Chief Commissioner of Coorg, Bangalore.  
NORTH-WEST FRONTIER PROVINCE :—Government Press, Peshawar.

Thacker, Spink & Co., Calcutta and Simla.  
W. Newman & Co., Ltd., Calcutta.  
R. Cambrai & Co., Calcutta.  
S. K. Lahiri & Co., Calcutta.  
The Indian School Supply Depôt, 309, Bow Bazar Street, Calcutta, and 226, Nawabpur, Dacca.  
Butterworth & Co. (India), Ltd., Calcutta.  
Rai M. C. Sarcar Bahadur & Sons, 90-2A, Harrison Road, Calcutta.  
The Weldon Library, 17, Park Street, Calcutta.  
Standard Literature Company, Limited, Calcutta.  
Association Press, Calcutta.  
Chukerverty, Chatterjee & Co., Ltd., 13, College Square, Calcutta.  
Higginbotham & Co., Madras.  
V. Kalyanarama Iyer & Co., Madras.  
P. R. Rama Iyer & Co., Madras.  
Rochouse and Sons, Madras.  
Bright & Co., Trivandrum.  
V. S. Swaminathan, Bookseller, West Tower Street, Madura.  
Thacker & Co., Ltd., Bombay.  
D. B. Taraporewala, Sons & Co., Bombay.  
Sunder Pandurang, Bombay.  
Ram Chandra Govind & Sons, Kalbadevi, Bombay.  
N. M. Tripathi & Co., Booksellers, Princess Street, Kalbadevi Road, Bombay.  
Proprietor, New Kitabkhana, Poona.  
The Manager, Oriental Book Supplying Agency, 15, Shukrawar, Poona City.  
R. S. Gondalekar's Book Depôt, Publisher and Bookseller, Budhwar Chawk, Poona City.  
Managing Director, Co-operative Bookstall, Booksellers and Publishers, Poona City.  
The Standard Bookstall, Karachi, Rawalpindi, Murree, Lahore, Peshawar, and Quetta.

The Book Company, Calcutta.  
Burma Book Club, Ltd., Rangoon.  
Karsandas Narandas & Sons, Surat.  
A. H. Wheeler & Co., Allahabad, Calcutta and Bombay.  
N. B. Mathur, Supdt., Nazir Kanun Hind Press, Allahabad.  
The North India Christian Tract and Book Society, 18, Clive Road, Allahabad.  
Ram Dayal Agarwala, 184, Katra, Allahabad.  
Manager, Newal Kishore Press, Lucknow.  
The Upper India Publishing House, Ltd., 41, Aminabad Park, Lucknow.  
Munshi Seeta Ram, Managing Proprietor, Indian Army Book Depôt, Juhu, Cawnpore.  
Rai Sahib M. Gulab Singh & Sons, Muddi-Am Press, Lahore and Allahabad.  
Rama Krishna & Sons, Booksellers, Anarkali, Lahore.  
Puri Brothers, Booksellers and Publishers, Katcheri Road, Lahore.  
Manager of the Imperial Book Depôt, 63, Chandni Chawk Street, Delhi.  
Oxford Book and Stationery Company, Delhi.  
Supdt., American Baptist Mission Press, Rangoon.  
Proprietor, Rangoon Times Press, Rangoon.  
The Modern Publishing House, Ltd., 50, Phayre Street, Rangoon.  
The International Buddhist Book Depôt, Post Box No. 971, Rangoon.  
Manager, the "Hitavada," Nagpur.  
S. C. Talukdar, Proprietor, Students & Co., Cooch Behar.  
Times of Ceylon Co., Ltd.  
The Manager, Ceylon Observer, Colombo.  
The Manager, The Indian Book Shop, Benares City.  
B. C. Basak, Esq., Proprietor, Albert Library, Dacca.

#### NOTE.

The estimated cost of the Tariff Board during its enquiry into the Paper Industry is as follows:—

	Rs.	A	P.
(1) Salaries of members and staff . . . . .	91,376	9	6
(2) Travelling allowance (including daily allowance) . . . . .	12,307	3	0
(3) Printing . . . . .	8,500	0	0
(4) Contingencies . . . . .	3,371	6	4



## TABLE OF CONTENTS.

### CHAPTER I.—INTRODUCTORY.

PARA.	PAGE.
1. Reference to the Board . . . . .	1
2. The Board's Procedure . . . . .	1
3. Evidence taken by the Board . . . . .	2
4. The Paper Mills on the Hooghly . . . . .	3
5. The up-country Paper Mills . . . . .	3
6. Paper industry in India to-day . . . . .	4
7. The raw materials of paper . . . . .	4
8. The raw materials of paper made in India . . . . .	5
9. Importance of " Sabai " grass and bamboo . . . . .	6
10. Separation of pulp manufacture from Paper . . . . .	6
11. The manufacture of chemical pulp . . . . .	7
12. Mechanical pulp . . . . .	8
13. Bleaching and beating . . . . .	8
14. The paper-making machine . . . . .	9
15. The essential points of paper manufacture . . . . .	9
16. Plan of the Report . . . . .	10

### CHAPTER II.—THE INDIAN MARKET FOR PAPER.

17. Extent of the claim to Protection . . . . .	11
18. Exclusion of ' Newsprint ' from the claim . . . . .	11
19. Impossibility of making newsprint in India . . . . .	12
20. Old newspapers . . . . .	12
21. Paper manufactures and strawboards, pasteboards, etc. . . . .	13
22. Classification of Paper imports . . . . .	13
23. Papers not likely to be made in India . . . . .	14
24. Estimate of possible expansion of Paper industry . . . . .	15
25. Opinion of the Calcutta Paper Traders' Association on paper made from " sabai " grass . . . . .	15
26. Views of the Controller of Printing on paper made from " sabai " grass . . . . .	16
27. Replies of the Mills to the criticisms of paper made from " sabai " grass . . . . .	16
28. Opinion of the Board as to the qualities of paper made from " sabai " grass . . . . .	17
29. Plea that protective duties would not lead to increased use of Indian paper . . . . .	18
30. Consumers not divisible into definite classes . . . . .	19
31. Inability of Indian mills to meet requirements of all users with paper made from " sabai " grass . . . . .	19
32. Increased output obtainable only by lowering prices . . . . .	20
33. Dumping . . . . .	21

PARA.	PAGE.
34. Relation of prices of Indian paper to prices of imported paper . . . . .	21
35. Dumping by the Indian Mills in the up-country markets . . . . .	22
36. Limitation of market for paper made from " sabai " grass . . . . .	23
37. Qualities of bamboo paper—Strength . . . . .	24
38. Other qualities of bamboo paper . . . . .	24
39. Difficulty of comparing prices of Indian and imported paper . . . . .	25
40. White printing paper . . . . .	25
41. Writing paper . . . . .	26
42. ' Badami ' paper . . . . .	26
43. Wrapping papers . . . . .	26
44. Prices realised by Indian mills . . . . .	27
45. Average prices realised for all kinds of paper . . . . .	28
46. Board's estimate of average prices likely to be realised . . . . .	29
47. Further decline in sterling prices not anticipated . . . . .	29
48. Selling methods of the Indian mills . . . . .	30

---

### CHAPTER III.—THE COST OF PRODUCTION.

49. The costs of three mills examined . . . . .	31
50. Primary materials . . . . .	31
51. Cost of " sabai " grass—Sources of supply . . . . .	31
52. Analysis of the cost of " sabai " grass at the mills . . . . .	32
53. Total cost of " sabai " grass at the mills . . . . .	33
54. Reasons for the high cost of " sabai " grass . . . . .	33
55. Probable cost of " sabai " grass . . . . .	34
56. Primary materials—Cost of bamboo . . . . .	34
57. Reasons for the high cost of bamboo from the Kasalong reserve . . . . .	36
58. Analysis of the cost of bamboo . . . . .	36
59. Extent to which the cost of bamboo could be reduced . . . . .	36
60. Probable cost of bamboo . . . . .	37
61. Auxiliary materials . . . . .	38
62. Auxiliary materials—Comparative costs . . . . .	39
63. Probable cost of auxiliary materials . . . . .	39
64. Total cost of materials . . . . .	40
65. Cost " above materials "—Power and Fuel . . . . .	41
66. Impossibility of comparing Indian and European coal consumption in paper mills . . . . .	42
67. Probable coal consumption at Naihati . . . . .	42
68. Coal consumption at Titaghur and Raniganj . . . . .	43
69. Probable coal consumption and cost of power and fuel . . . . .	43
70. Coal consumption if first class coal is used . . . . .	44
71. Cost above materials—Labour . . . . .	45
72. Cost above materials—Repairs and Maintenance . . . . .	45
73. Cost above materials—General and Miscellaneous . . . . .	46
74. Total Works Costs . . . . .	46
75. Estimate of reduced costs at Raniganj . . . . .	47
76. Titaghur estimates of future costs . . . . .	48
77. The India Paper Pulp Company's estimate of future costs . . . . .	49

PARA.	PAGE.
78. Estimated cost of manufacture in a mill near Chittagong . . . . .	50
79. Overhead charges—Head office expenses and remuneration of Managing Agents . . . . .	51
80. Overhead charges—Interest on working capital . . . . .	51
81. Capital expenditure involved in the establishment of a paper mill in India . . . . .	52
82. Overhead charges—Depreciation . . . . .	53
83. Fair return on capital . . . . .	53
84. Summary of Board's conclusions regarding costs of production . . . . .	53

---

CHAPTER IV.—PROPOSED PROTECTIVE DUTY ON IMPORTED PULP.

85. Anticipated shortage of wood for pulping . . . . .	55
86. Proposed manufacture of paper pulp from bamboo . . . . .	55
87. Reasons advanced for a protective duty on wood pulp . . . . .	56
88. Attitude of the grass mills to the proposed duty on paper pulp . .	56
89. Prospects of the export of bamboo pulp from India in the future .	57
90. Difficulty of forecasting the date when the export of bamboo pulp will be possible . . . . .	57
91. Estimates of the cost of bamboo pulp . . . . .	58
92. Price at which it would be possible to ship pulp for export . .	59
93. Prices of wood pulp which would render possible the export of bamboo pulp . . . . .	59
94. Grass mills likely to manufacture their own bamboo pulp if a duty is imposed on wood pulp . . . . .	60
95. Growth of a separate Pulp industry impossible . . . . .	61
96. Separation of pulp manufacture from paper manufacture not feasible at present . . . . .	61
97. Possibility of replacing imports of wood pulp by bamboo pulp not yet established . . . . .	62
98. Protective duty on imported pulp not recommended . . . . .	63

---

CHAPTER V.—EXAMINATION OF THE CLAIM TO PROTECTION.

99. " Sabai " grass as a paper-making material . . . . .	64
100. Mr. Pearson's evidence as to the supplies of " sabai " grass . .	64
101. Sabai grass—Evidence of the Paper Mills . . . . .	65
102. Cost of " Sabai " grass at the Mill . . . . .	65
103. Reasons for the high cost of " Sabai " grass . . . . .	66
104. Possible location of paper mills near the grass fields. . . . .	66
105. Natural advantage of India in respect of " sabai " grass a very limited one . . . . .	67
106. Proposed erection of grass pulp mill near Saharanpur . . . . .	68
107. Bamboo as a paper-making material . . . . .	68
108. No great danger of simultaneous flowering of bamboo . . . . .	69
109. Cost of bamboo at the mill . . . . .	69
110. Indian supplies of bamboo . . . . .	70
111. The five selected bamboo areas . . . . .	71
112. The Board's conclusions about bamboo . . . . .	72

PARA.	PAGE.
113. India has no advantage in the cost of chemicals . . . . .	72
114. Possible reductions in the cost of chemicals . . . . .	73
115. Fractional digestion . . . . .	73
116. Economies resulting from fractional digestion . . . . .	74
117. High cost of chemicals in the sulphite process . . . . .	74
118. Power and Fuel . . . . .	75
119. Labour—European staff of the Paper mills . . . . .	75
120. Explanation given by the mills of slow progress in Indianisation	76
121. Necessity for training Indians in paper manufacture . . . . .	77
122. Labour in Indian paper mills relatively cheap . . . . .	77
123. Market for paper in India . . . . .	78
124. High initial cost of paper mills in India . . . . .	78
125. Advantages and disadvantages of the Indian Paper industry . . . . .	79
126. Position of the grass mills if protection were withheld . . . . .	80
127. Manufacture of paper from bamboo not likely to continue without protection . . . . .	81
128. Fiscal Commission's third condition as applied to the grass mills . . . . .	81
129. Difficulty of estimating the prospects of bamboo paper . . . . .	82
130. Probability that bamboo paper could eventually dispense with protection . . . . .	82
131. Future of the industry dependent on the use of bamboo . . . . .	83

---

CHAPTER VI.—THE BOARD'S CONCLUSIONS AND RECOMMENDATIONS.

132. Summary of the Board's conclusions . . . . .	84
133. Assistance to be given for five years . . . . .	85
134. Impossibility of raising fresh capital in the open market . . . . .	86
135. Proposed loan or guarantee of capital to the India Paper Pulp Company . . . . .	87
136. Conditions on which capital might be provided . . . . .	87
137. Possibility of testing the soda process at Rajahmundry . . . . .	88
138. Possibility of manufacturing bamboo paper at Rajahmundry . . . . .	89
139. Necessity for ascertaining cost of bamboo and of power and fuel at Rajahmundry . . . . .	89
140. Difficulty of testing the soda process commercially elsewhere than at Rajahmundry . . . . .	90
141. Average price which manufacturers of bamboo paper should realise . . . . .	91
142. Prospects of the India Paper Pulp Company, if average price realised were Rs. 560 a ton . . . . .	92
143. Additional capital and higher average selling price both necessary . . . . .	93
144. Bounty on bamboo paper not recommended . . . . .	93
145. First objection to bounties on bamboo paper . . . . .	94
146. Second objection to bounties on bamboo paper . . . . .	94
147. Additional assistance required should be given by increase of Customs duties . . . . .	95
148. Exclusion of wrapping papers from the protective duties . . . . .	95
149. Protective duties applicable to all printing and writing papers with specified exceptions . . . . .	96

PARA.	PAGE.
150. Exclusion of newsprint from the protective duties . . . . .	96
151. Proposed uniform specific duty on printing and writing papers . . . . .	97
152. Principles regulating the exclusion of certain papers from the protective tariff . . . . .	98
153. Average price likely to be realised for bamboo paper . . . . .	99
154. Average prices likely to be realised by the grass mills . . . . .	99
155. Probable results of the protective duties to the grass mills . . . . .	100
156. Some or all of the " grass " mills likely to survive for the next five years . . . . .	100
157. Protective duties not likely to encourage new enterprises . . . . .	101
158. The burden on the consumer . . . . .	101
159. Additional duties bring prices back to the 1s. 4d. level . . . . .	101
160. Higher duties not likely to prejudice the Printing industry . . . . .	102
161. Effect of the protective duties on the Customs Revenues . . . . .	103
162. Final appreciation of the conditions which necessitate protection . . . . .	103
163. General effect of the proposals made . . . . .	104
164. Acknowledgment of the help received . . . . .	104
165. Recommendations unanimous though Report signed by two Members only . . . . .	105

---

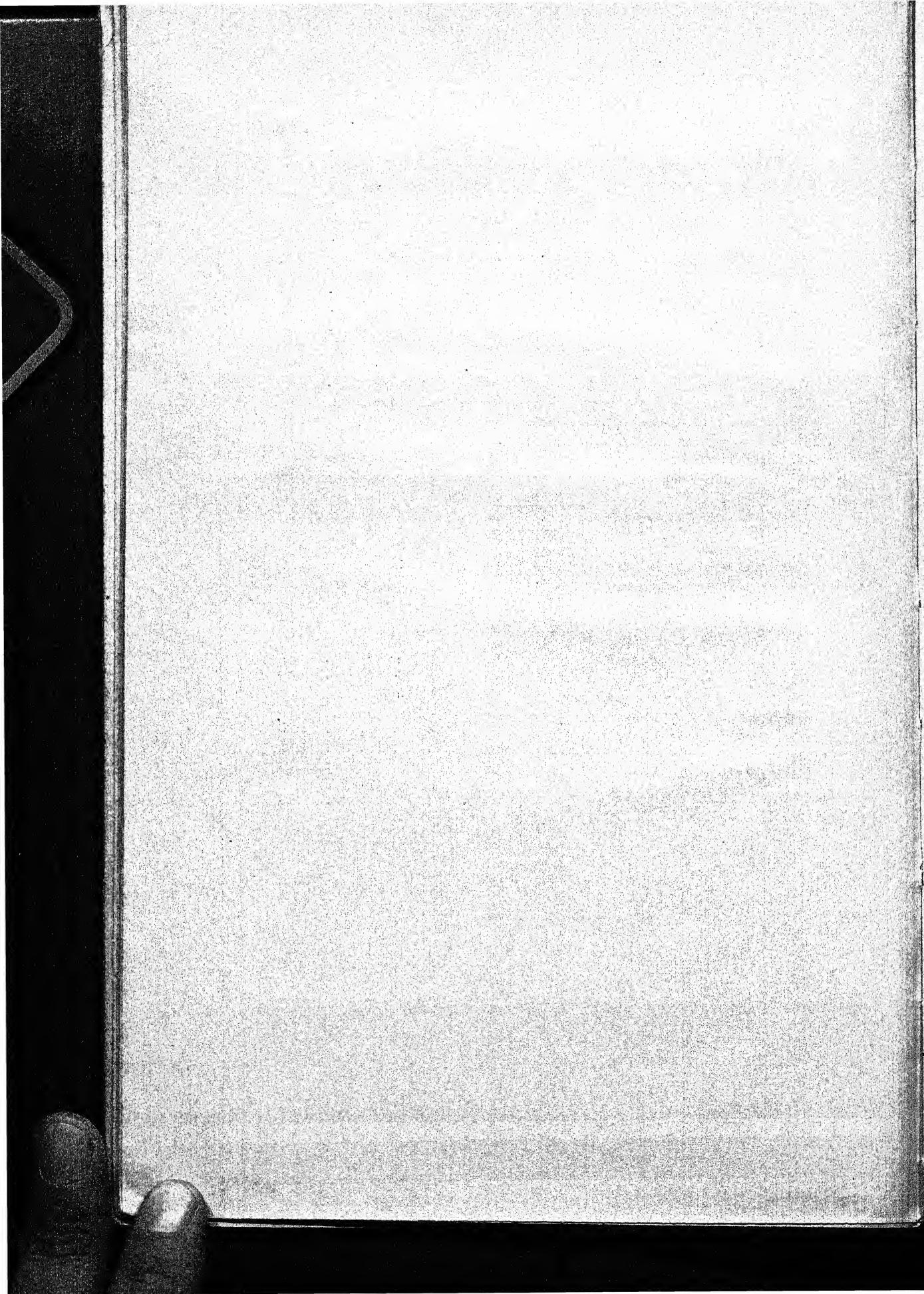
#### ANNEXURE

Summary of the Board's recommendations . . . . .	106
--	-----

---

#### APPENDICES.

I. Capacity and output of the five principal Indian Paper Mills . . . . .	107
II. Analysis of the Works Costs of the Indian Paper Mills . . . . .	108
III. Analysis of the cost of <i>sabai</i> grass used by the Indian Mills . . . . .	109
IV. Note on the quantity of <i>sabai</i> grass required to make a ton of paper . . . . .	110
V. Estimated cost of manufacturing bamboo pulp . . . . .	112
VI. Note on the equipment of the grass mills in Bengal . . . . .	116
VII. Proposed sections of the Tariff Schedules embodying the Board's recommendations . . . . .	118



## CHAPTER I.

### Introductory.

1. The claim to protection made on behalf of the Paper industry  
Reference to the Board. was referred (along with four other industries) to the Tariff Board in the Resolution of the Government of India in the Commerce Department No. 38-T., dated the 10th April 1924, which is reproduced below:—

“ In pursuance of paragraph 3 of the Resolution of the Government of India, Department of Commerce, No. 3748, dated 10th July 1923 (Tariffs), the Government of India have decided to refer to the Tariff Board for examination applications for protection received from the following industries, *viz.*, Paper, \* \* \* \* \*

- (2) In making its enquiry the Tariff Board will be guided by the principles laid down in the Resolution adopted by the Legislative Assembly on February 16th, 1923, and in particular, will consider how its recommendations, if it makes any, will affect industries using these articles. The Tariff Board will conduct its enquiry into these applications in any order it deems most convenient.
- (3) Firms or persons interested in any of these industries, or in industries dependent on the use of these articles, who desire that their views should be considered by the Tariff Board, should address their representations to the Secretary to the Board, Simla.”

The original claim to protection for paper was put forward by the Indian Paper Makers' Association\* in a representation dated 15th June 1923 and addressed to the Government of India in the Commerce Department. Subsequently, in January 1924 the India Paper Pulp Company, Limited, joined in the demand, and at the same time asked that a protective duty might be imposed on paper pulp imported from abroad.

2. The procedure adopted by the Board in their enquiry into the Paper industry (as well as in the other enquiries simultaneously made over to them) was outlined in a Press Communiqué issued on the 17th April 1924. The object sought to be attained was that the case for protection should be fully elucidated, both in the written statements of the paper-making firms and in the oral evidence of their representatives, and that the evidence should thereafter be published, and all

---

\*This body includes only two firms, *viz.*—The Titaghur Paper Mills Company, Limited, and the Bengal Paper Mill Company, Limited.

interested in the subject invited to lay their opinions before the Board. This was the procedure actually followed. A detailed questionnaire was drawn up and sent to the various paper mills on the 16th May 1924. Replies were received from seven firms, and the representatives of four of them were examined orally at Simla on various dates between the 23rd June and the 24th July. From Simla the Board proceeded to Dehra Dun, where Mr. R. S. Pearson, Forest Economist, and Mr. W. Raith, Cellulose Expert, of the Forest Research Institute were examined orally. The evidence thus taken, together with the opinions received from certain Local Governments and others, was published on the 8th September. A representative of the Deccan Paper Mills Company, Limited—one of the three firms who sent replies to the questionnaire but did not give oral evidence in Simla—was examined orally at Poona in November. Neither of the other two companies—the Punjab Paper Mills Company, Limited, and the Carnatic Paper Mills Company, Limited—has yet completed its mill or commenced manufacture, and oral evidence was not given on their behalf.

3. We had hoped to publish the evidence of the applicants by the end of July at the latest, but the mills

Evidence taken by the Board. found it impossible to draw up their replies

to the questionnaire as soon as had been expected, and difficulty was experienced in arranging dates for the oral examination of their representatives. The result was to delay by five or six weeks the publication of the evidence, and this inevitably retarded the completion of the enquiry. Representations were received from 32 persons and firms other than the manufacturers of paper, and 16 witnesses were examined orally, 7 at Bombay in September, 2 at Poona in November and 7 at Calcutta in December. All the members of the Board visited the Titaghur and Kankinara mills of the Titaghur Paper Mills Company, Limited, and the Naihati mill of the India Paper Pulp Company, Limited, in August, and two members visited the Lucknow mill of the Upper India Couper Paper Mills Company, Limited, in the same month. We are under a deep obligation to the un-official witnesses who responded to the Board's invitation to express their opinions on the claim to protection, and it was evident that much care and thought had been devoted to the preparation of several of the replies sent in. We desire to acknowledge also valuable information supplied by Local Governments in response to the enquiries addressed to them, and by the Controller of Printing, Stationery and Stamps, who also gave oral evidence. Mr. Pearson and Mr. Raith of the Forest Research Institute placed unreservedly at our disposal the information acquired by laborious investigations extending over many years, and, by directing our attention to important aspects of the subject, they furnished very useful guidance. Our enquiry terminated at the end of December 1924, after the representatives of the three principal paper mills had again been examined orally in order to elucidate points which had been brought to notice in the evidence taken.

4. The manufacture of paper by hand has existed in India for centuries and was at one time well established,   
The Paper Mills on the Hooghly. but is now almost extinct. No representation on behalf of this branch of the industry

has reached us, and we shall not refer to it again. The production of machine-made paper in India apparently dates from the establishment in 1870 of the Bally Mills on the Hooghly, and it is in this neighbourhood that the principal seat of the industry is still to be found. Starting with a single machine, the Bally Mills were able in course of time to increase that number to 4, with a maximum output of over 5,000 tons a year, but their success was not permanent and the Company was liquidated in 1905, when two of their machines were taken over by the Titaghur Paper Mills Company, which was floated in 1882 and commenced manufacture at Titaghur with three machines in 1884. Several years later, between 1892 and 1894, a third mill was established on the Hooghly at Kankinara by the Imperial Paper Mills Company. This venture was never successful, however, and in 1903 the Kankinara Mill was taken over by the Titaghur Company. As they exist to-day, the Titaghur and Kankinara Mills contain 8 machines, with a maximum output of 20,000\* tons of paper annually. For 30 years after 1892 no new paper mill was established on the Hooghly, but in 1922 the manufacture of paper was commenced in the Naihati Mill of the India Paper Pulp Company, Limited, a firm established in 1918 for the production of pulp and paper from bamboo. At present it has one machine, and a maximum output of 2,750 tons of paper annually.

5. The oldest of the up-country mills—the Upper India Couper Paper Mills Company, Limited, at Lucknow   
The up-country Paper Mills, —was established in 1879 and commenced manufacture in 1882 with one machine, a

second being added in 1894. The full capacity claimed for these machines is 4,000 tons of paper annually, but only one of them is worked at present. Another mill with a single machine was erected by the Maharaja Scindia at Gwalior in 1881, but had eventually to be closed down as it could not be run at a profit. It remained closed for several years, but was reopened during the latter part of the war under the management of the Bengal Paper Mill Company, Limited. It was finally shut down in 1922 when the machinery was removed to Raniganj, and incorporated in the plant of the Bengal Company's mill at that place. In 1885 the Deccan Paper Mill Company, Limited, was formed, and commenced production in 1887 at Poona. This also is a single-machine mill and has a maximum output of 1,700 tons. It continued to produce for a number of years, but ceased to operate in March 1924, owing to the depressed condition of the trade. The most important of the up-country mills is situated at Raniganj and is the property of the Bengal Paper Mill Company, Limited. This Company was formed in 1889, and manufacture commenced in 1891

\* So given in the replies to the questionnaire. In the evidence taken later the full output was assumed to be 18,000 tons.

at first with one machine, but three more were subsequently added in 1892, 1900 and 1922. The full capacity of the mill is 8,400 tons of paper annually. There are three other small paper mills in India which do not call for any detailed notice. Two of them are situated at Bombay and the third at Punalur in the Travancore State. Only the commoner and cheaper kinds of paper are produced at these mills. A mill established in Burma after the war by Messrs. Jamal Brothers to manufacture paper out of bamboo was, we understand, destroyed by fire in 1922 before production commenced.

6. There are at present nine paper mills in India, of which three (the two Titaghur mills and the Bengal mill at Raniganj) have four machines each, one (the Couper Mill at Lucknow) has two machines, and the remainder one machine each. The two Bombay mills and the Travancore mill are, however, unimportant and for practical purposes it may be said that the industry is carried on in 5 mills with 16 machines in all. The important particulars about these five have been given in Appendix I. The aggregate capacity for production claimed by the Mills themselves is nearly 37,000 tons of paper a year, but this estimate is probably too high, for many of the machines are old, and, if they were worked at full speed, the quality of the paper produced would be apt to deteriorate. We do not think that the full capacity of the existing mills can be put higher than 33,000 tons a year. Two new mills are projected, and one of these has been partially constructed at Rajahmundry in Madras by the Carnatic Paper Mills, Limited. It will be capable, when completed, of producing about 1,600 tons of paper from straw, but the Company also intends eventually to manufacture some 3,000 tons of paper annually from bamboo. The other mill will be erected near Saharanpur in the Punjab by the Punjab Paper Mills Company, Limited, with a capacity of 6,000 tons a year. If both projects are brought to completion, the aggregate capacity of all the Indian mills would be raised to about 43,000 tons of paper annually.

7. Paper has been defined\* as "a fabric composed mainly of minute vegetable fibres which have been deposited on to a sieve-like structure from their suspension in water, and commingled and felted together in such a way as to form a homogeneous sheet or web." The vegetable fibres can be obtained from an endless variety of sources so that theoretically the supply of paper-making materials is unlimited, but practically the choice is governed by the necessity that the fibre should be such as will give the paper the requisite strength, and that the supply should be sufficiently abundant to permit of cheap production. For the latter reason the raw material of the paper maker must be very nearly a waste product, for which there is little or no demand for other purposes. For very many

\*H. A. Maddox: Paper—its History, Sources and Manufacture.

years paper was made in Europe chiefly out of old rags, and especially linen rags, and for the highest qualities of paper rags are still indispensable. But for the commoner kinds of paper rags were gradually ousted by Esparto grass which came into common use for paper-making during the latter half of the 19th century. Towards the end of the century a fresh and most important development occurred when wood fibre began to be exploited as the staple paper-making material. The trees found most suitable are the conifers, which grow abundantly in Scandinavia and the Baltic States and also in Canada and the United States of America. The enormous expansion of the world's output of printed matter which has occurred in the last 50 years is directly connected with the use of wood fibre, and it ranks as unquestionably the cheapest raw material for paper yet discovered. But whereas grass renews itself annually, in Northern Europe and America it may take 60 years after replanting before the trees reach the size when they are ripe for felling. Recently, owing to the great and growing demand, the destruction of coniferous woods both in Europe and America has been so vast, and so little has been done to replace the timber destroyed, that grave apprehension has been aroused as to an impending shortage. It is this which has turned the minds of many paper-makers to the search for an alternative material, if possible self-reproductive like grass, on which they can fall back when wood becomes too expensive. It is possible that a solution of the problem has been found in the use of bamboo, and this possibility has a most important bearing on the future of the industry in India.

8. The staple material of the paper-maker in India has hitherto been *sabai* grass, which grows abundantly in many parts of Northern India and possesses qualities closely resembling those of Esparto grass. No attempt has yet been made to make paper from Indian wood, and apparently those trees most likely to be suitable either grow in remote and inaccessible regions, or are so intermixed with other trees that economical extraction is impossible. Indian paper, it is true, contains a good deal of wood fibre, but this is imported from Europe in the form of pulp. For the cheaper kinds of paper, such as wrappings and "badami," considerable quantities of rags, hemp and jute waste are used and also waste paper. But the last named contributes nothing to the strength of the paper and is used for filling rather than as a raw material proper. Two of the Indian mills are in an exceptional position as regards raw materials. The India Paper Pulp Company make paper from bamboo with a small admixture of imported wood pulp, but the use of the latter material is a temporary expedient, rendered necessary by the fact that the mill is not equipped to produce sufficient bamboo pulp to keep the paper machine constantly running. When this lack of balance in the plant has been rectified, bamboo only will be used. The Deccan Paper Mill at Poona is the second exception. This mill has never used grass, but depends almost entirely on rags and imported wood pulp.

9. It will be necessary in this Report to concentrate attention almost entirely on *sabai* grass and bamboo. Importance of *Sabai* grass and bamboo. Hemp and jute waste are really subsidiary materials, and it is not claimed that India

has any special advantage in respect of them. This comment applies also to rags, for the quality of most of the rags obtainable in India is poor, and there seems to be no possibility of manufacturing in India those high class rag papers in which some mills in Europe specialise. The experts attached to the Forest Research Institute at Dehra Dun have made extensive investigations into the possibility of utilising Indian grasses other than *sabai*, and the prospects of some of them appeared reasonably good, but some of them is a practical proposition at the moment. *Moong* grass, for example, is an excellent paper-making material, but it is so much in demand for other purposes that its use would not be economical. The savannah grasses of Assam were thought at one time to be full of promise, but the extension of cultivation in the Assam Valley, and the consequent destruction of the grass, threatens to make the project impossible. A Bombay firm, Messrs. Kamat and Sons, have obtained a concession from the Bombay Government for the extraction of grasses from forest areas in the Tapti Valley and propose to utilise them in a paper mill to be erected on the banks of the river. Laboratory experiments made in Europe suggest that the grasses are likely to be suitable, and in other respects the conditions are not unfavourable, but the various kinds of grass grow closely intermixed and it is not possible to isolate individual kinds. The material used in the mill would, therefore, be a mixture of grasses, and it remains to be proved whether such a mixture would be suitable for paper-making. Experiments are likely to be made shortly at the Forest Research Institute to determine this point, but at present no conclusion is possible. Last in the list of potential raw materials comes rice straw, which was actually used by the Titaghur Mills during the war and which the Carnatic Paper Mills intend to use in their mill at Rajahmundry. It is doubtful, however, whether this material will be suitable for any papers except cheap wrappings and news. The fibre is much inferior to the fibre obtained from *sabai* grass, and owing to Indian farming conditions it is exceedingly difficult to obtain the rice straw clean. After it has been winnowed it still contains a certain amount of rice and husks, and these will appear as ugly looking specks in the paper. In considering the claim to protection, we have not found it necessary to consider seriously any raw materials except *sabai* grass, which has been the staple material in the past, and bamboo, which offers great possibilities for the future.

10. We cannot attempt any detailed account of the process of Separation of Pulp paper manufacture, but it is necessary to manufacture from Paper. bring out clearly the essential points. So long as rags and grass were the staple materials used, all stages of manufacture, from the first to the last, were commonly carried out in a single mill, but in this respect a great change has come about with the use of wood fibre. Paper

can of course be made, and is often made, both in Europe and America, in mills situated in the vicinity of the timber supplies, and in that case there is no departure from the older practice. But in the majority of cases it has been found economical and expedient to divide the process into two stages. A large number of mills devote themselves solely to the production of what is known as wood pulp, and this pulp is subsequently made into paper in other mills which may be situated in a different country altogether. The great bulk of the paper now made in England consists of wood fibre, which has been imported as pulp from Scandinavia and the Baltic countries, and similarly the United States of America import large quantities of wood pulp, not only from Canada but also, to an increasing extent, from Norway and Sweden. It is still an open question whether the development in India of the manufacture of paper from bamboo will proceed on the same lines with the separation of pulp production as an independent branch of the industry.

11. The process of pulp manufacture involves substantially three operations. In the first place the materials, as they reach the factory, have to be cleaned by the removal of all dirt and extraneous matter which, if allowed to remain, would spoil the appearance of the paper. In India the grass and rags are usually cleaned (often very imperfectly) by hand, but in Europe machinery is much more freely used for this purpose. Bamboo requires much less cleaning, but, on the other hand, whereas the cleaned grass and rags have only to be cut to suitable lengths to be ready for the next stage, the bamboo is first crushed and then cut into small chips by machinery designed for the purpose. The second stage of pulp manufacture is the removal by chemical means of those constituents of the material which are not wanted in the final result, so as to leave only the cellulose which essentially is the fibre. Grass is treated by being boiled under pressure in a strong solution of caustic soda. Wood can also be treated with soda, but there are two alternative processes, both involving the use of sulphur, and known respectively as the 'sulphite' and 'sulphate' processes. A modification of the sulphite process is used by the India Paper Pulp Company at Naihati for making bamboo pulp. The third stage of pulp manufacture is the washing of the pulp to get rid of all soluble compounds and so save bleach later on. In the Indian grass mills the pulp is transferred from the boilers (usually known as digesters) by hand to what are known as the 'breakers,' where simultaneously with the washing the pulp is broken up and disintegrated by a revolving roll fitted with steel knives and set parallel to a bed-plate on the floor of the 'breaker' which is similarly fitted. In an up-to-date European mill no separate 'breaker' equipment is required. The digester is directly connected with the washer by a pipe, and as soon as the process of digestion is complete, the pipe is opened and the steam pressure blows the pulp into the washer.

while simultaneously the high pressure steam with which the pulp is saturated operates with explosive effect to break up and disintegrate the fibre. As soon as the pulp has been washed, it can be run through a drying machine (very similar to a paper-making machine) and is then ready for transport elsewhere. If it is to be made into paper in the mill itself, it passes on in a liquid condition to the bleaching stage.

12. Pulp made from wood in the manner described in the last paragraph is known as 'chemical' wood pulp.

Mechanical pulp.

There is also another variety known as 'mechanical' wood pulp, which is produced by grinding the wood without the use of any chemicals. A paper made entirely of this pulp would be exceedingly weak and could hardly be used, but most newspapers are printed on a paper which contains 70 per cent. of mechanical pulp and 30 per cent. of chemical pulp. This is the paper which goes by the name of 'newsprint.' Mechanical pulp is also used in varying, but smaller, proportions for the production of many kinds of the cheaper papers, but such papers are subject to the disadvantage that they are weak and liable to rapid discolouration.

13. Pulp is sold by the pulp mills both bleached and unbleached, so that the bleaching process cannot

Bleaching and beating. be assigned definitely either to pulp or paper. The pulp is steeped in a solution of chloride of lime and, whilst undergoing the process, is kept constantly in motion, either in receptacles specially designed for the purpose or in the 'beaters', which are circular vessels very similar to the 'breakers' described in paragraph 11, but having many more knives fitted to the roll and the bed-plate. The object of the 'beating' process, which belongs essentially to the paper stage of manufacture, is to effect a complete separation of all the single fibres, and it is on the success with which the beating is carried out that the quality of the finished paper mainly depends. The beater is first partially filled with water and the bleached pulp is added gradually until the material has the consistency required for the particular kind of paper under manufacture. It is at this stage that the acquired skill of the trained paper-maker is indispensable, and he must be guided largely by his sense of touch when he has to decide whether the 'beating' is completed. For each quality of paper the adjustment of the knives on the roll and the bed-plate, and the time taken in beating, will be different. Thus, for example, when blotting paper is being made the pulp is beaten quickly with sharp knives, with the result that the fibres are short and cleanly cut. For a strong writing paper the knives used are dull, and the 'beating' may last six times as long, producing fibres which are long and frayed. While the pulp is in the 'beaters' the colouring, loading, and sizing materials are added. The colouring materials are mineral pigments and aniline dyes, and the loading consists of an admixture of china clay to fill up the interstices between the fibres. The object of sizing is

to render the surface of the paper less absorbent, and the materials used are rosin and alum. High class writing papers are sometimes sized with glue and gelatine after the paper has come off the paper machine, and these are known as tub-sized papers. But in India nearly all the paper produced is engine-sized, this name being given because the sizing is added in the beating engine.

14. From the 'beaters' the pulp passes on to storage tanks. The paper-making machine. The pulp becomes paper, three operations are necessary, namely, to interlace the fibres, to remove the water, and to add the smoothness of surface and finish required. From the storage tanks the pulp flows on to an endless mould of fine wire cloth which continually revolves in a forward direction and at the same time vibrates horizontally from side to side. As the pulp is carried forward, much of the water is gradually drained away, while the vibratory motion of the cloth interlaces the fibres. The result is that the pulp leaves the wire cloth a formed web of paper, but still containing a great deal of moisture. Most of this moisture is extracted by passing the web by means of endless felts between pairs of press rolls, and it is finally dried by passing it over a series of hollow steam-heated drying cylinders, so placed that both surfaces of the web are alternately in contact with the heating surface. The web then passes through two or more sets of "calenders" (chilled iron rolls), the number varying according to the smoothness of surface and finish required. As it leaves the machine, the paper is wound on a reel and is cut into sheets later on a separate machine.

15. The description of the process of paper manufacture attempted in the foregoing paragraphs is The essential points of necessarily incomplete and for technical purposes valueless. But the attempt has been made because we shall have to refer at times to particular parts of the process, and unless some account of it is given, these references would be unintelligible. The vital operations are—

- (1) The removal by chemical means from the fibre of the elements which are not required, so as to isolate the cellulose. It is this process which converts the fibre into chemical pulp.
- (2) The bleaching of the pulp with chloride of lime.
- (3) The treatment of the pulp in the beaters. It is here that the experience of the trained paper-maker comes chiefly into play, and the quality of the paper made depends mainly on his skill and experience.
- (4) The conversion of pulp into paper on the paper machine. Here the essential point is the interlacing of the fibres on the wire cloth and the ingenuity of the craftsman has had ample scope in devising the apparatus by which

this is accomplished. All the other stages of manufacture are ancillary to these four.

16. In the second Chapter of this Report we shall discuss the market for paper in India, the course of Plan of the Report. prices and the kinds of paper to which the claim for protection can fairly be extended. The third Chapter will be devoted to an analysis of the cost of production, the fourth to a discussion of the proposed duty on imported pulp, and the fifth to the examination of the claim to protection for paper in the light of the conditions laid down by the Fiscal Commission. Our conclusions and recommendations as regards paper will be explained in Chapter VI.

## CHAPTER II.

### The Indian Market for Paper.

17. The proposal of the paper-making firms that all kinds of paper without discrimination should be subjected to a protective duty of 25 per cent. clearly required a close scrutiny. It was not claimed that every kind of paper was, or could be, produced in India, but it was asserted that eventually the country itself could supply nine-tenths of its requirements. The manufacturers estimated that the annual consumption of paper (including strawboards, pasteboard, etc.) was from 90,000 to 100,000 tons, that the Indian production exceeded 30,000 tons, and that the kinds of paper manufactured or likely to be manufactured, in India, accounted for between 80,000 and 90,000 tons out of the total. The production of paper in India in 1923 was only 27,000 tons, but as the imports in 1923-24 amounted to 72,000 tons, the actual consumption in that year was in accordance with the estimate. It was admitted that no Indian paper was cheap enough to compete with the low grade European papers containing a considerable percentage of mechanical pulp, but the imposition of a duty on such papers was justified on the ground that, if they were exempted, the great difference in price between them and the better classes of paper would lead to substitution on an extensive scale. The India Paper Pulp Company advanced, in addition, the broader argument that the exemption of various kinds of paper would tend to confine the development of the paper trade to certain narrow channels and to prevent its spread over the broad fields it might otherwise occupy.

18. With few exceptions the important Indian newspapers are printed on 'newsprint', a kind of paper which contains about 70 per cent. of mechanical wood pulp. The c.i.f. price of this paper varies from £18 to £22 a ton, the cost of what is known as 'glazed mechanical' used by papers which specialise in illustrations, being somewhat higher than that of ordinary newsprint. The landed cost of the paper, including duty, to a newspaper importing direct would be from about 2 annas 1 pie to 2 annas 6 pies a lb. whereas the price of the cheapest white printing paper sold by the Titaghur Mills to certain newspapers was stated in July 1924 to be about 4 annas a lb. Since then the mills have reduced the price of white printing by 6 pies a pound, so that the news quality would sell at 3 annas 6 pies. An increase in the duty on newsprint from 15 to 25 per cent. would raise the price by less than 3 pies a lb. leaving a wide gap between the prices still to be bridged. The paper-making firms recognised from the first that there was a special difficulty here, and suggested that the newspapers might be granted licenses to import newsprint at the lower rate of duty.

But while such a system might meet the needs of the principal newspapers who import newsprint direct, it would be very unfair to the smaller papers who purchase their requirements from dealers. During the oral examination of the manufacturers at Simla we drew their attention pointedly to the strong objections which could be urged to the imposition of a protective duty on newsprint, and asked them to reconsider the matter. As a result they informed us on the 30th August, 1924, of their willingness that mechanical newsprint should be exempted from an increase over its present duty "at any rate until such time as we can see what effect such differentiating may have on the paper trade generally." They suggested that the exemption should extend to all paper containing more than a certain percentage (to be fixed by the Board) of mechanical wood pulp.

19. We have no doubt that the manufacturers were well advised in abandoning what was clearly an untenable Impossibility of making claim. An increase of 10 per cent. in the newsprint in India. duty on newsprint would have been nugatory in its effect, for it would have failed to divert the trade to the Indian mills. Newspapers are ephemeral things, they do not require a strong and durable paper, and cheapness must be for them the primary consideration. It is impossible for the Indian mills using Indian materials to manufacture at a cost which would enable them to compete with imported newsprint. Mechanical pulp has never been made from either grass or bamboo, and the existence of a cheap newspaper press depends directly on the use of a paper containing a high proportion of mechanical wood pulp. The imports of newsprint into India in 1923-24 amounted to 10,000 tons, and increased to nearly 18,000 tons in 1924-25. This is a section of the paper market which the Indian mills cannot hope to supply.

20. In a representation addressed to the Board by the Calcutta Paper Traders' Association, a suggestion was made that in place of protective duties on paper, a surcharge of Rs. 10 a ton should be levied on the importation of old newspapers and the funds used to assist the industry. The suggestion did not commend itself to us, but it served to draw our attention to the fact that old newspapers in bales and bags make up 30 per cent. of the total imports of paper into India. These newspapers come almost entirely from the United Kingdom, and are imported largely in Bombay, Sind and Burma where they are used as the cheapest kind of wrapping paper. For tariff purposes they are valued at Rs. 130 a ton (11 pies a lb.), so that the 15 per cent. duty is just short of Rs. 20 a ton. It is obvious at once that no manufactured paper can possibly compete at the price, and in ascertaining the market which the Indian mills might possibly capture, the old newspapers must be excluded. Nevertheless, although the imports of old newspapers have been shown separately in the monthly Trade Returns since April 1923, all the manufac-

turers who gave evidence had included them in their estimate of the trade which could be captured. These imports amounted to a little over 22,000 tons in 1923-24 and to nearly 26,000 tons in 1924-25.

21. Two other exclusions must be made before the effective paper manufactures and demand for paper can be determined, namely strawboards, pasteboards, paper manufactures, (that is, articles manufactured out of paper) and pasteboard, millboard and cardboard. The paper mills who have applied for protection do not make either class of goods, and we have received no representation from any other firm or person asking that such articles should be protected. The imports of paper manufactures in 1924-25 were 1,600 tons, and of pasteboard, millboard and cardboard 10,800 tons.

22. It will be convenient to classify in tabular form the imports of paper according to what has been said in Classification of Paper imports. The figures are given for the years 1923-24 and 1924-25, and are rounded off to the nearest 100.

*Imports of paper that may compete with Indian paper.*

	1923-24.	1924-25.
	Tons.	Tons.
Printing paper other than newsprint . . . . .	9,900	11,700
Writing paper and envelopes . . . . .	8,100	8,300
Packing paper . . . . .	4,900	7,000
Other kinds of paper . . . . .	2,700	2,000
Government Stores . . . . .	1,900	1,000*
<b>GRAND TOTAL . . . . .</b>	<b>27,500</b>	<b>30,600</b>

\* Estimated. The quantity of paper imported as Government Stores is not given in the monthly Trade Returns. The value of these imports was Rs. 9 lakhs in 1924-25 as against Rs. 17.5 lakhs in 1923-24.

*Imports of paper, pasteboard, etc., that do not compete with Indian paper.*

	1923-24	1924-25
	Tons.	Tons.
Newsprint . . . . .	10,000	17,800
Old newspapers . . . . .	22,100	25,700
Paper manufactures . . . . .	1,100	1,600
Pasteboard, millboard, etc. . . . .	10,600	10,800
Government Stores . . . . .	600	300*
<b>GRAND TOTAL</b>	<b>44,400</b>	<b>56,200</b>

It will be seen that the total market the Indian paper mills can ultimately hope to capture at the present rate of consumption is not 50,000 or 60,000 tons, as the manufacturers originally claimed, but 30,000 tons at the outside, and probably a great deal less.

23. The imports of paper include certain kinds which are not likely to be made in India at all, or not for papers not likely to be made in India many years to come. In the first place, the expensive rag papers cannot be made in India, because Indian rags are of low quality, and in this case there is a permanent disability owing to the absence of the raw material required. In the second place, for the manufacture of some kinds of paper a special equipment may be necessary, and if the demand for any one kind is small, it would not be worth while for any Indian mill to install the apparatus. This criterion would exclude, to mention only a few instances, all coated paper, such as Art paper, and special manufactures, such as blue match paper and tissue paper. In the third place, even when no special equipment is necessary, the Indian mills are likely to be at a disadvantage if a high quality of paper is wanted, because their product is in competition with paper made in European mills which specialise in the manufacture of particular kinds of paper, and consequently are much more likely to satisfy the taste of an exacting customer. The Indian market is too small to admit of specialisation in this sense, and, so long as this is so, the more expensive papers are likely to be imported from abroad. Almost the whole of the paper made by the Indian mills is sold at prices varying from 3 annas to 5 annas a lb., and all imported paper selling at 6 annas a lb. and upwards must be regarded as outside their range at present. Finally, at the other end of the scale there are cheap wrapping papers, such as Nature Browns and Machine Glazed Pressings, which contain a considerable percentage of mechanical pulp, and are imported

\* Estimated.

at prices varying from £15 to £20 a ton c.i.f. The Indian mills cannot hope to get down to these prices, using the materials available in this country.

24. No elaborate classification of the paper imports is attempted

Estimate of the possible in the Trade Returns, and they furnish no expansion of the Paper data from which we could calculate what industry.

proportion of the imports likely to compete with Indian paper should be excluded on the grounds stated in the last paragraph. We do not think, however, that the total of such kinds can be put at less than one-third. The imports of any one kind may be inconsiderable, but there are many varieties and the aggregate of all the kinds is substantial. On this basis the market which Indian paper might conceivably capture under a protective system is two-thirds of 30,000 tons (see paragraph 22), *i.e.*, 20,000 tons. We do not think this is an under-estimate, and in view of the fact that the manufacturers were ignorant of the scale on which old newspapers were being imported, we can place no reliance on their figures. If our estimate is a reasonable one, it is clear that no great expansion of the Paper industry is possible in the near future. The existing mills could increase their output by 5,000 or 6,000 tons, and an addition of 7 or 8 new paper machines would increase the productive capacity of the industry by about 15,000 tons. But while 20,000 tons may be regarded as the maximum increase in output which might be attained in favourable circumstances, it will not in fact be achieved unless the Indian paper maker can produce paper of satisfactory quality. To this aspect of the case we now turn.

25. We are indebted to the Calcutta Paper Traders' Association

Opinion of the Calcutta for a full examination of the qualities of Paper Traders' Association Indian paper and a detailed comparison of on paper made from *sabai* Indian and imported papers, and as the views grass.

advanced by the Association are in harmony with the opinion of most of the firms and persons who gave evidence as consumers, they may be taken as representative. The Indian paper discussed by the Association is the paper made from a mixture of grass and wood pulp in the Titaghur and Bengal mills. About bamboo paper they had not much to say, for it is still something of a novelty and opinions as to its quality are tentative. The Association mention three reasons why paper made from *sabai* grass finds favour with some consumers. It is a strong and durable paper and stands wear and tear; it is bulky in proportion to its weight; and the paper sold as printing paper can also be used as a writing paper. Considered as a writing paper for ordinary use, they regard the Indian paper as perfectly satisfactory, and remark "we know of no papers made by any mill in the world which for that price, or even near that price, can give the same service." On the other hand, the Association find that, considered as a printing paper, the Indian paper has very grave defects. Its finish is poor; its surface is often spotted, dirty and uneven; the outturn is not uniform and dependable; and finally the colour is not up to the mark and is apt to deteriorate rapidly. They admit that there

has been some improvement in these respects during the last two years, but the results are still far from satisfactory. The Association allege that since 1895 the Indian mills have been unable to adapt themselves to new developments, such as the introduction of the super-calendered paper (also called Ivory Finish) suitable for printing with process blocks, or to produce the varieties of printing paper which the market needs. They concede that Indian paper may have certain advantages in flat-bed presses and those which print wet, but in a modern press which prints dry, or with rotary machines, it is not satisfactory. It is greatly inferior to imported printing paper for any class of work where appearance and finish are important.

26. The only other evidence bearing on this point which deserves

Views of the Controller of Printing on paper made from *sabai* grass. detailed citation is that given by Mr. Ascoli, the Controller of Printing, Stationery and Stamps. He specifically refers in his

evidence to the poor finish of the papers made from grass, to the speckled and dirty surface often found, and to the lack of uniformity, not only as between one consignment and another, but as between different sheets in the same ream. If, for example, the sheets are not uniform in thickness, constant adjustments of the printing machine are necessary in order to get a uniform impression on each sheet. Another defect is a high percentage of faulty sheets which leads to a waste of paper, as the printing machine has to be stopped, and two or three more sheets may be spoiled before this can be done. In the year 1924 he had been compelled to reject large quantities of paper tendered by the mills in execution of their contract with Government. In one case 382 tons of printing paper tendered by the Titaghur mills was rejected, and in another case 11 tons of paper tendered by the Bengal Company. The rejections in previous years had never approached these figures. Mr. Ascoli did not claim that imported papers were faultless in the points mentioned by him, but the average standard was much higher. Paper made from *sabai* grass had another defect, and one that was directly associated with its good qualities. It is strong and durable, but the fibre is very hard, and is apt to blunt the type. The presses under his control used large quantities of Indian grass paper for ordinary printing, but when a good appearance or finish was required, as in books, either imported paper or Indian bamboo paper was used. We do not propose to allude to other criticisms of the paper produced by the grass mills, but we must record the fact that the opinions expressed by consumers as to the quality of their printing paper were almost invariably unfavourable.

27. When we examined the representatives of the mills in

Replies of the Mills to the criticisms of paper made from *sabai* grass. December 1924, we drew their attention to these criticisms, and their replies must be summarised. There was a frank admission that during the war the quality had been sacrificed to output, and that since the war the mills had found

it difficult to get back to the standard of 1914. The speckled and dirty surface, of which complaints had been made, was due to the presence in the paper of small impurities such as dirt or fragments of roots, leaves or weeds, brought into the mill with the *sabai* grass and not removed before the grass was placed in the digesters. The Titaghur Company stated that they had recently installed machinery for cleaning the grass more effectively, and believed that in this way the difficulty would be overcome. Mr. Carr on behalf of the Bengal Mill ascribed the impurities to the manner in which the grass was collected in the fields and to a particularly wet monsoon in 1923. He hoped to effect an improvement by closer supervision of collections. The imperfect finish and the lack of uniformity in the paper output from the Titaghur Mills were stated to be due mainly to mechanical difficulties occasioned by the process of over-haul and renovation which the machinery had recently undergone. Apart from that, it was difficult to combine strength and bulk with a high finish. In the Calcutta market the former qualities were the more important, but in the Bombay market greater stress was laid on finish, and when manufacturing for that market they put in more loading, thus producing a better finished, but weaker, paper. Mr. Carr of the Bengal Paper Mill Company admitted that in the Raniganj mill they had never been able to recover the pre-war standard of efficiency, and had been seriously handicapped by staff difficulties during the latter part of 1924. Both Companies denied that their paper was inferior in colour to imported paper or that the colour deteriorated more rapidly.

28. The evidence placed before us makes it clear that the difficulty the Indian mills find in selling their

Opinion of the Board as to the qualities of paper made from *sabai* grass.

output must be due in part to the fact that the paper produced does not possess the qualities which some consumers require. From the admissions of the representatives of the mills it is evident that in respect of finish, cleanliness of surface and uniformity of quality the paper made in India from *sabai* grass during the last five years has not been satisfactory and is inferior to the paper made by the same mills before the war. The criticisms of the colour of Indian paper are disputed, but they have not been disproved, and they are confirmed by Mr. Ascoli's statement that the whitest paper supplied by the mills was the weakest. This would be the natural result of over-bleaching, and the fact suggests that the presence of impurities in the grass is actually responsible for an inferior colour. The Titaghur Company ascribed the rejection of considerable quantities of paper by the Controller of Printing, Stationery and Stamps in 1924 to a distinct raising of the standard, but it does not appear that the specifications in the calls for tenders have in fact been made more stringent. What has happened is rather this, that the Controller has begun to enforce more strictly standards which were completely relaxed during the war and were very leniently enforced thereafter. That war-time conditions should lead to a sacrifice of

quality was to be expected, for that was a feature common to most industries, and the lost efficiency could not be recovered in two years, or even three. Some improvement has admittedly taken place in 1923 and 1924, but much remains to be done. The mills have certainly striven to set matters right, and during the last five years have spent large sums on bringing their machinery up-to-date. But the industry has been in existence for more than 40 years, and cannot claim the consideration which is naturally extended to an infant industry. Nor will it suffice merely to recover the pre-war standard of quality. Something more than that is required if paper made from *sabai* grass is to displace substantial quantities of paper imported from abroad.

29. Several witnesses interested in paper as merchants or con-

Plea that protective consumers urged strongly the view that the im-  
duties would not lead to position of protective duties would be in-  
creased use of Indian effective and would not materially increase  
paper.

the market open to the Indian mills. Paper, it was pointed out, was not a uniform thing, but included many varieties, each of them adapted to some particular purpose. Besides, within any one variety the purchaser had usually a wide range of choice, for the price varied with the quality, and if the price of the paper he was accustomed to buy were raised, he would solve the difficulty by substituting the next lower grade. That might not serve his purpose quite so well, but it would be good enough, and better than Indian paper at the same price. Indian paper made from *sabai* grass was not often in direct competition with imported paper, but was purchased mainly by those who preferred it on account of its special qualities, such as strength, bulk and suitability for writing and printing alike. These constituted one class of consumers. The purchasers of imported paper belonged to a different class. Either they wished to buy the cheapest paper obtainable, in which case imported paper containing a high percentage of mechanical pulp was much cheaper than any paper made in India, or they wanted some special quality which Indian grass paper did not possess, such as a clean surface or a high finish. If protective duties were imposed on all kinds of paper indiscriminately, those who cared for cheapness and nothing else would continue to buy the 'partly mechanical' paper, while those who insisted on special qualities would shift their demand, e.g., from Art paper to an Imitation Art, or from a wood-free paper to a 'partly mechanical'. In neither case would the purchaser be driven to use Indian paper unless the protective duties were very high indeed. The price of Indian paper was in the main determined (so it was stated) not by foreign competition but by internal competition between the Indian mills. We have endeavoured to state concisely an argument which was advanced, subject to various qualifications, and was supported more strongly by some witnesses than by others. It was important to ascertain how far it was in accordance with the facts, and we discussed the question with the representatives of the paper mills when we met them towards the end of our enquiry.

Their attitude was that the argument was not maintainable, that the paper they sold was constantly in direct competition with imported paper, and that if protection were given they could increase their sales substantially.

30. In this matter we are not inclined to take an extreme view.

Consumers not divisible into definite classes. It would be absurd to argue that Indian paper was never in direct competition with imported

paper, for the mills were able to adduce a number of specific cases in which orders had been lost, because they had been unable to reduce their prices. On the other hand, it would be equally absurd to argue that there were no purchasers whose needs could not be met by paper made from *sabai* grass, or to deny that in many cases the consumer would meet a rise in price by purchasing a cheaper imported paper rather than Indian paper. We believe that, taken with proper qualifications, the view suggested in paragraph 29 contains a large element of truth. The mistake its advocates are inclined to make is to argue as if the two classes of consumers were rigidly defined and every purchaser belonged permanently to one or the other. There are certainly those who would not in any circumstances purchase paper made from *sabai* grass, either because cheapness is their only object, or because their requirements are entirely special. But with all other consumers the question is merely one of price. At one extreme there are those who definitely prefer the Indian paper and in order to secure it would pay a higher price than they would give for any chemical wood paper; at the other, there are purchasers who prefer the imported paper and will not buy Indian paper at all unless it is very much the cheaper. Between these two extremes there are endless gradations, and there is no absolute dividing line between two classes of consumers. It is not possible, we think, to determine even approximately what difference in price would be necessary to divert to the Indian mills the whole demand which could be satisfied by paper made in India. But if our view of the facts is correct, important consequences follow, and these deserve to be noticed.

31. In the first place, it is clearly established that a great deal of paper which might be made in India is

Inability of Indian mills to meet requirements of all users with paper made from *sabai* grass. imported, because the paper actually made in India lacks the qualities which the customer requires. He could make shift to use Indian

paper if it were decidedly cheaper, but with anything like equality of price he will not. In this respect the whole position might be changed if more paper were made from bamboo, or if the grass mills could overcome the defects which interfere with the sale of their paper, but we have to deal with the situation as it exists to-day. Now a claim to protection put forward in such circumstances almost necessarily involves a theory that, in order to benefit the producer, the consumer may justifiably be forced to buy something which is not exactly suited to his requirements. There were distinct traces in the evidence given by the

paper mills, of views which tended in this direction. They were ready to admit that no paper could be made in India to compete in price with the partly mechanical papers, but their original proposal was that newsprint should be included in the protective scheme. They admitted again that Art paper could not be made in India, and that its price would be at least 6 annas a lb. and often much higher, whereas the best that the Indian mills could offer would be an Imitation Art paper at about 4 annas a lb. And still it was argued that, even if the consumer was paying as much as 8 annas a lb. for Art paper, it was fair to compel him by protective duties to use the inferior substitute, although the difference in price he was prepared to pay for the real thing made it obvious that its special qualities were essential to him. We are altogether unable to countenance pretensions of this kind. It is often necessary, when protective duties are imposed, to include within the scheme commodities not made in the country imposing the duties, because, if excluded, they would compete with what is produced. It will certainly be necessary to follow this course if protective duties are imposed on paper. But the initial presupposition is that the Indian manufacturer can satisfy the reasonable requirements of the consumer, both as to the kind and the quality of goods which he requires. If the claim to protection for paper rested solely on the past performances of the mills using *sabai* grass, we do not think this condition could be said to be satisfied.

32. If the mills using *sabai* grass can meet fully the requirements of one set of consumers, but only par-

Increased output obtainable only by lowering prices.

tially and in varying degree the needs of the remainder, another consequence at once follows, namely, that the mills can only

increase their output by lowering their price. They already number among their customers those who consider Indian paper at current prices good value for their money, and it must be presumed that those who purchase imported paper do so because for their purposes Indian paper, when quality is taken into account, is too dear. That being so, they will not be induced to buy Indian paper unless, as compared with imported paper, it becomes relatively cheap. If an additional duty were placed on imported paper and the mills raised their prices to the same extent, they could not hope to sell a large output, for their paper would still be in the same price relation to imported paper. It is this fact which explains the remark of the Titaghur Company in a supplementary statement submitted in July 1924 that "if an additional 10 per cent. duty is imposed, we do not look to get this figure of annas 4 per lb. of paper, but we do look to stabilise sales round about the present prices, thereby enabling us to fill our works with orders at present prices." This remark has been criticised by sceptical persons as if it implied an altruistic intention to forego, wholly or in part, the benefits of protection. But clearly the writer had no such intention. What is of interest to the manufacturer is not the gross price he realises, but the difference

between that price and his cost of production. It may pay him better to sell at the old prices rather than to raise them, if he can thereby increase his output and keep his works fully employed. The circumstances of the paper trade appear to be such that a policy of this kind would pay the manufacturer best.

33. In the claim for protection, as originally presented by the Dumping. mills, great stress was laid on the prevalence of dumping and on the injury thus inflicted on the Indian Paper industry. Some of the paper dealers, on the other hand, went to the opposite extreme and contended that the price of Indian paper was not determined by foreign competition at all, but by internal competition between the mills themselves. It will be convenient to consider these two theories together. The question of dumping is very much one of definition. The Paper industry in Europe is passing through a period of bad trade, when the demand is poor and the mills have difficulty in selling their output. In these circumstances it may naturally be expected that the British and German mills will sell for export at prices distinctly below the prices charged to domestic consumers. Dumping in this sense is probably responsible for the low price of many kinds of imported paper, though not of all. The Scandinavian mills cannot pursue the same policy, for the domestic consumption of Norway and Sweden is small, and no mill can afford to dump 80 or 90 per cent. of its output. It follows that when the imported paper comes chiefly from these countries, the price is not affected by dumping. Except to the extent indicated above, it has not been established that dumping exists or that any special attack is being made on the Indian market, and indeed evidence has been given by one of the mills (see paragraph 34) which makes it clear that the low c.i.f. prices of imported paper cannot be taken as the prices actually paid by many consumers. The dumping, in so far as it exists, is therefore to a large extent ineffective.

34. The assertion that the price of paper produced by the Indian mills is determined not by the price of imported paper, but by internal competition between the mills themselves does not seem to us to be well founded. The Titaghur and Bengal Companies have for a number of years worked together, and raised and lowered prices simultaneously; and though the India Paper Pulp Company works independently, there is nothing in the evidence to suggest that it has taken the lead in price cutting. There are, however, peculiar features in the price situation, and these must be described. In the first place, it appeared from the figures given by the Titaghur and Bengal Companies that, since the war, the mills have been able to realise higher prices for their paper than the prices of the corresponding imported paper, and none of the explanations given in oral examination appeared to go to the root of the matter. But the representatives

Relation of prices of Indian paper to prices of imported paper.

of the Titaghur Company threw some light on the subject when they stated that under cover of the prices fixed by the mills the dealers in imported paper were realising higher profits, *i.e.*, they kept prices at the highest point at which they could sell in competition with Indian paper, so that the benefit of a low c. i. f. price was not passed on to the consumer. The dealers who gave evidence did not seriously dispute the statement, and the Calcutta Paper Traders' Association remarked that they attempted "to get higher prices for imported goods" and added the frank admission (unprecedented in our enquiries) "it is not often that we are compelled to sell at a loss". If the facts are so—and we have no reason to doubt them—the Indian mills' prices, once fixed, determine the prices at which the dealers will sell imported paper, and such a state of affairs would be impossible if an intensive and systematic policy of dumping were being pursued. But it does not follow that the mills' prices themselves are not governed by the general level of world prices. The real fact appears to be that during a period of steadily falling values the mills have constantly been compelled to cut prices in the hope of stimulating sales, and the dealers have always had sufficient margin to come down to a lower level without sacrificing profits, with the result that at the new level the mills might maintain, but could not increase, their output. In this sense it may be true that during the last two years the price reductions have originated with the mills, but ordinarily they would be effected by pre-arrangement and would not be due to internal competition.

35. The second unusual feature in the price situation is the fact that the price of Indian paper is the same *Dumping by the Indian Mills in the up-country markets* in the up-country markets as it is in Calcutta, *i.e.*, the mills bear the freight up-country.

It might have been expected that the up-country price would be higher than the Calcutta price by at least the amount of the railway freight, or even by a little more, since the mills enjoy freight concessions on waggon-load consignments to the principal centres. In this case also the explanations furnished in oral examination did not make the matter clear. It is impossible to attribute the anomaly to the importers, for they can have no conceivable motive for foregoing in Delhi and Lahore a profit to which they cling in the seaports. The explanation seems to be that, in the effort to increase their output, the mills have been compelled to resort to that practice of dumping with which they charge their foreign competitors, and to unload their surplus stocks at unremunerative prices in the less important markets. The Bengal and Titaghur paper is best known and has acquired its firmest hold in Bengal and Bihar, and it is the price in this market which matters most to the mills. Elsewhere it may be worth while to make price concessions if in that way sales can be increased. No other reasonable explanation of the practice has been suggested, and it is evidently for the same reason that in Bombay the mills sell at a price lower than the Calcutta price.

It appears therefore that the relation of up-country prices to prices in the ports is determined not by the importers but by the mills, and it is quite possible that in the up-country market the mills more often compete against each other than they do in Bengal and Bihar.

36. From paragraph 25 onwards we have considered almost ex-

Limitation of market for exclusively the Indian market for paper made paper made from *sabai* from *sabai* grass. Our review of the evidence grass. suggests the inference that there is a natural

limit to the quantity of paper which, under existing conditions, can profitably be made from this material, and that this limit has already been approached, if not exceeded. It may be that *sabai* grass is as good a paper-making material as Esparto, and that paper could be made from it which would rival the high quality papers made from Esparto in Europe. But there is only a small demand for paper of this kind in India, and nothing would be gained by attempting to produce it. The Indian mills must therefore produce from *sabai* grass a paper which will compete in price with the European papers made from chemical wood pulp. This may be possible only to a limited extent. The very quality which makes *sabai* grass valuable, *viz.*, its durability and strength, is associated with the defect of hardness, which makes the material intractable in the paper machine, and the paper a trial to the printer, whose stereo plates wear out too quickly. In fact a paper made entirely from *sabai* grass would not be satisfactory, and the mills admit that some admixture of chemical wood pulp is necessary. The minimum quantity of wood pulp required has been put down as from 15 to 20 per cent., but actually both before and after the war the mills have been using from 30 to 40 per cent., and sometimes more. The paper produced by the Titaghur and Bengal Mills is therefore very far from being a pure grass paper, but even so, the hardness of the grass makes itself felt, as Mr. Ascoli pointed out. In these circumstances, while *sabai* grass may be an admirable material for many kinds of paper, there will be others for which it is unsuitable, either because the cost of securing the quality required may be too high, or because the specific virtue of the material may be lost in the process of overcoming the difficulty. Sir Willoughby Carey told us that it is not easy to combine strength with a high finish, for if the loading is increased the paper is weakened. We are not satisfied that there is much room for an extended use of *sabai* grass in paper-making in India, and if there were no alternative material, the prospects of future development would not be very bright. It is important therefore to consider how the position is affected by the appearance of bamboo as a new raw material, for it may possess the qualities which *sabai* grass lacks, and if bamboo pulp could be substituted for imported wood pulp, India would be freed from its dependence on foreign supplies.

37. We have received few detailed opinions as to the quality of the paper made from bamboo by the India Paper Pulp Company, and this was to be expected, for sufficient time has not yet elapsed to enable users to express a final judgment. But the evidence given is sufficient to clear up the facts. All those who expressed opinions agreed that the paper made from bamboo was not as strong as paper made from *sabai* grass. Mr. Haldar, giving evidence for the Calcutta Paper Traders' Association, stated that, while bamboo paper was not as strong as grass paper, it was better in this respect than the imported paper. Mr. Ascoli stated in his oral evidence early in December 1924 that when Government first began to purchase this paper, it was very weak indeed, but it was now much stronger and in every way satisfactory. Subsequently, on the 9th of January 1925, he drew our attention to facts which tended to throw doubt on the strength of paper made from bamboo. Certain supplies received from the India Paper Company in December 1924 were deficient both in tensile strength and folding resistance, and tests made on supplies of an earlier date seemed to indicate an unduly rapid deterioration in these respects. In a subsequent letter the Controller informed us that further tests showed that the deterioration in bamboo paper was "certainly neither greater nor more rapid than in the case of a *sabai* grass paper"; and we do not think that any anxiety need be felt on this point. A full explanation of the weakness of the paper supplied to the Controller in December was given by the India Paper Pulp Company, and we are satisfied of its correctness. The 'beating' equipment has no reserve capacity, and when one of the beating engines is put out of commission for repairs, the strength of the paper necessarily suffers. The weakness was due to accidental causes and not to any inherent defect in the fibre or the process of manufacture. We are satisfied that while paper made from bamboo has not the same strength as paper made from *sabai* grass, it is as strong as, or possibly even stronger than, paper made from wood pulp.

38. The bamboo fibre, again, lacks the hardness of the grass fibre, and indeed Mr. Haldar informed us that when bamboo paper first came in, it was too soft, but it had now improved in that respect. It is free, therefore, from one defect of *sabai* grass, and paper can be made entirely from bamboo without any admixture of wood pulp. Bamboo paper, however, lacks the bulking quality of grass paper and cannot so easily be used both for printing and for writing. On the other hand, both in finish and cleanliness of surface it is greatly superior to grass paper, and does not compare unfavourably with imported paper. Mr. Ascoli's verdict on this point was that it was as good a paper for ordinary purposes as any imported paper, and that, if made in England, it would compete with English papers in the home market. Other witnesses were less emphatic, but all agreed that the bamboo paper was superior to the grass paper.

in these two points, and for that reason had a better chance of displacing imported paper. From the evidence it seems clear that bamboo paper does not possess the characteristic defects and merits of grass paper and much more closely resembles the paper made from wood pulp. This is a fact of great importance because it opens up avenues of development which were closed to the Indian Paper industry so long as it was dependent solely upon *sabai* grass. A paper made from bamboo will meet the needs of those users who dislike the grass paper, and possibly bamboo pulp may take the place of wood pulp as a constituent of paper made principally from grass.

39. The conditions of the Indian paper trade are such that it is extraordinarily difficult to say with what difficulty of comparing class of imported paper a particular Indian prices of Indian and imported paper is in competition. The manufacturers complain that they are subject to a special

handicap because they have to make a larger variety of papers than European mills, and it is probably true that the requirements of the Indian market could not be adequately met by the Indian mills unless they were prepared to produce many kinds of paper. But one of the charges against the mills is that in fact they do not supply what the market wants, and for this reason cannot increase their sales. The evidence we have taken leads us to believe that in order to keep down costs the mills have not attempted to diversify production, and do not make so many kinds of paper as might have been expected. Their policy has been to adhere to a few standard types, and, if necessary, to reduce prices in order to sell their output, rather than to obtain higher prices by multiplying the kinds of paper produced. The adoption of this policy may have been inevitable, but the result is that the competition between Indian and imported papers becomes entirely a question of the price at which the mills can sell without loss. Each kind of paper produced by the mills is in competition not with one kind of imported paper but with several, and a direct comparison of prices, kind by kind, is not possible. In these circumstances the ordinary method of determining the measure of protection required by an industry is hardly feasible. The only comparison that can be made is between the average price obtained by the mills over a period for some standard class of paper made by them, *e.g.*, white printing, and the range of prices of those classes of imported paper which compete with it. The price which the mills have actually obtained in the past, when imported prices were at a certain level, is on the whole the best criterion to determine what price they are likely to obtain in the future if the duty is increased. On these lines we shall review briefly the main classes of paper with which we have to deal.

40. The imported printing papers with which the white printing paper made by the mills comes into competition fall mainly under the following heads, Machine Finish, Antique, super-calendered (or Ivory

Finish) and Imitation Art. The Machine Finish paper is the cheapest wood-free paper imported, and is the paper most directly comparable with Indian white printing. The highest grade Antique is a pure Esparto paper and expensive, but the lower grades contain a mixture of Esparto and wood pulp and compete with the country-made Antique. Super-calendered (or Ivory Finish) paper is more highly glazed and has a smoother surface than Machine Finish paper, and is imported in large quantities for books, periodicals, catalogues and all advertising literature. This class of paper is made in India only by the Titaghur mills, and the quality does not apparently compare favourably with the imported paper. Imitation Art paper is used chiefly as a substitute of Real Art paper in illustrations. It is not made in India at present, but there is no reason why it should not be made. It probably does not compete much with Indian paper at present, but would do so if protective duties were imposed on other papers and not on it. The c.i.f. prices of all four classes of paper lie between £28 and £32 a ton.

41. In the case of writing papers it is not so easy to distinguish the kinds which are in competition with Writing papers. Indian paper, and the question is mainly one of price. Generally, it may be said that any imported writing paper competes with Indian paper if the c. i. f. price is between £26 and £36 a ton. Paper costing less than £30 a ton would probably be partly mechanical. Paper costing more would be made of wood pulp, but near the higher limit might contain a mixture of Esparto grass. Mention should also be made of the so-called Account Book (printing), which is used largely in the Bombay Presidency and by up-country merchants for account books. It has a glazed hard surface and is preferred by those who use pens made from reeds or bamboo twigs. The c. i. f. price is about £32 a ton.

42. The "badami" paper made by the Indian mills is a buff coloured, unbleached or half bleached paper, "Badami" paper. used both for printing and for writing, and is commonly sold at a price 10 or 11 pies a lb. less than the price of white printing. Its only foreign competitors are papers containing a proportion of mechanical pulp, and these are sometimes dyed buff to imitate "badami". The Indian paper would usually have the preference wherever the durability of the paper was important. The c. i. f. price of the 'part mechanical' papers would be from £22 to £26 a ton.

43. The imported wrapping papers may be divided into three main classes. At the bottom of the scale are Wrapping papers. the Nature Browns, which contain a high proportion of mechanical pulp and are brought in at about £15 a ton c. i. f. This paper has no virtue except its cheapness, and no paper

can be produced with Indian materials at anything like the same price. The two papers that do compete with Indian wrappings are Manilla and Kraft. The former is made of hemp, with or without an admixture of jute, and the price varies according to the quality from £21 to £30 a ton. The Indian mills also produce Manilla paper, but it is said to be inferior to the imported article. Kraft paper is made of sulphate wood pulp and is valued on account of its bulk and strength. The c. i. f. price is about £24 a ton. The evidence makes it clear, we think, that the Brown paper made by the Indian mills is inferior to Kraft and is likely to be supplanted by the latter. There is also an Imitation Kraft, the c. i. f. price of which is about £18 a ton.

44. Since the middle of 1923, apart from minor fluctuations, there has not been any very decided movement in the sterling c. i. f. prices of imported paper. But owing to the rise of the rupee sterling exchange from 1s. 4d. to 1s. 6d., the rupee prices of imported paper have fallen substantially, and the Indian mills also have been compelled to lower their prices. This factor has to be taken into account, but if allowance is made for it, the prices which the Indian mills may expect to realise in the face of foreign competition can be ascertained. The prices per lb. realised in 1923 and the early months of 1924, as given in the answers to the questionnaire, are as follows:—

*Prices realised per lb.*

	Titaghur Paper Mills Company.	Bengal Paper Mill Company.	India Paper Pulp Company.
	A. P.	A. P.	A. P.
White printing	1923 . . . .	4 5½	4 9
	1924 . . . .	4 3	4 6
Cream-laid	1923 . . . .	4 11½	5 0
	1924 . . . .	4 6	4 6
Browns	1923 . . . .	...	3 4
	1924 . . . .	...	3 1½

None of the mills has given the price of "badami" paper, but it may be taken as 10 to 11 pies a lb. lower than the price of white printing. It will be noticed that the Titaghur Mills and the India Paper Pulp Company have given identical figures for white print-

ing and Cream-laid, and it is clear, we think, that the prices recorded are not the actual realisations on all sales, but are arrived at, after deducting 6 pies a lb. to cover selling charges and freight, from the gross selling price fixed from time to time. Necessarily these prices exclude all sales under special contracts, such as the purchases of the Controller of Printing, Stationery and Stamps, and the average prices actually realised must have been lower.

45. Although we are not in a position to give the actual prices realised for each kind of paper separately, Average prices realised for all kinds of paper. the mills supplied us with figures showing the net prices realised on the average for all kinds of paper, and the India Paper Pulp Company gave their prices both including, and excluding, the cheaper kinds of paper such as Brown, "badami", unbleached, etc. The figures are tabulated below:—

*Average prices per lb.*

	TITAGHUR PAPER MILLS COMPANY.	BENGAL PAPER MILL COMPANY.	INDIAN PAPER PULP COMPANY.	
	All kinds.	All kinds.	All kinds.	White printing and writing only.
1923 . . . .	Annas.	Annas.	Annas.	Annas.
April to September 1923 . .	...	3·90	...	...
October 1923—March 1924 . .	...	...	3·99	4·26
April 1923—March 1924 . .	4·03	...	...	...
January—June 1924 . .	...	3·71	...	...
April—September 1924 . .	3·83	...	4·6	4·17
July—October 1924 . .	...	3·68	...	...
October—November 1924 . .	...	...	3·95	3·99

The Titaghur Company informed us that the average price realised for all kinds of paper could be taken as very close to the average price for white printing. The Bengal Company manufacture a higher percentage of Browns and "badamis", and in their case the average price realised for all kinds of paper is lower. The India Paper Pulp Company have concentrated more and more during the last two years on the better kinds of paper and the

percentage of the output covered by Brown, "badamis", Unbleached, News and Unglazed has been as follows:—

April to September 1923 . . . . .	44.2
October 1923 to March 1924 . . . . .	30.1
April to September 1924 . . . . .	14.8
October and November 1924 . . . . .	5.7

The result is that the average price for all kinds is now practically identical with the average price of white printings and writings, and a little above the price of white printing.

46. The figures tabulated in paragraph 45 do not disclose the Board's estimate of full effect of the rise in the exchange, and in average prices likely to be the case of the India Paper Pulp Company it realised. is completely masked by the fall in the percentage of cheap paper manufactured. The explanation is that from April to September the Companies were engaged in a hard struggle to maintain prices in the face of a rising exchange, and the injury they suffered was reflected not so much in lower prices as in a decline in sales and the accumulation of stocks. After the end of the half year, it became impossible to continue this policy and prices had to be cut drastically, the gross price of white printing being reduced from 4 annas 9 pies a lb. to 4 annas 3 pies, and the price of Cream-laid from 5 annas to 4 annas  $4\frac{1}{2}$  pies. These prices would be equivalent to about 3 annas  $10\frac{1}{2}$  pies and 4 annas net for paper sold in Calcutta, and the average for all sales would be somewhat lower. We estimate that the average prices likely to be realised by the three Companies are as follows:—

	A. P.
Titaghur Mills . . . . .	3 7
Bengal Mill . . . . .	3 5
India Paper Pulp Company . . . . .	3 8

We believe that the figures given above are a reasonable estimate of the prices at which the mills can expect to sell their present output, with world prices of paper at their present level, with the present rates of duty and with the rupee sterling exchange at 1s. 6d. The mills are manufacturing to about five-sixths of capacity, and in order to increase their sales to full capacity, further reductions in price would certainly be necessary. It is these prices, we think, which must be taken into account when the question is considered whether the industry can survive without additional protection, and if so, what amount of protection is necessary.

47. The question may be raised whether it is safe to assume that world prices will continue at about their present level, and whether allowance should not be made for a further fall. One or two witnesses took this view, and particularly Mr. Haldar, who gave evidence on behalf of the Calcutta Paper

Further decline in sterling prices not anticipated.

Traders' Association, but on the whole the weight of the evidence is decidedly against it. The last two or three years have undoubtedly been a very unremunerative period for the Paper industry in Europe, and our attention has been called to numerous complaints of unremunerative prices in the Trade Papers. A recovery in trade would probably be accompanied by some stiffening in prices as the demand increased. But apart from that, there is always in the back ground the apprehended shortage of wood for pulping, a factor which must exert a steady influence and will tend to maintain prices, even if it does not raise them. We shall discuss this question more fully in Chapter IV. There is, of course, the possibility of a further rise in the rupee sterling exchange, but into this thorny question we cannot enter. The tariff machinery must, however, make provision to safeguard industries from the injury they may suffer by sudden fluctuations in the exchange.

48. Before closing this chapter we must refer briefly to one question which occupies a good deal of space in the evidence, but on which we have not felt compelled to arrive at any finding. The

Selling methods of the Indian mills.  
selling methods of the Indian mills were freely criticised by the paper dealers and others, and the chief points assailed were the maintenance by some mills of expensive selling establishments including several Europeans, the selling of paper by mills direct to consumers at wholesale price in competition with their own dealers, the high rates of discount allowed to dealers, and the throwing on the market of good paper at a low price in the form of "job lots." All these points might be of importance in our enquiry if it could be shown that the net result was that the mills were not realising prices as high as could be obtained with better management. We do not think the witnesses have succeeded in proving this, or even making it probable, and it is no part of our duty to criticise the action of the mills on grounds which are not directly relevant to our investigation. We may add that some of the criticisms seemed to us to be expressed in an exaggerated form. We do not believe that direct sales by the mills in competition with their own dealers have been frequent, and at a time when the dealers are admittedly making high profits on imported paper, it is idle to condemn as excessive the much smaller discount they allow to dealers. As for the job lots, we have ascertained from the Titaghur Mills (who were considered the chief offenders in this respect) that the job lots despatched from April to December 1924 were 294 tons, which is equal to 2.73 per cent. of the total despatches. The great bulk must have been indifferent paper which could be disposed of in no other way. The critics did not perhaps always remember that, when an industry is suffering from a falling demand, measures to which in normal times the manufacturer would not resort will be taken to promote sales and to reduce stocks.

## CHAPTER III.

### The Cost of Production.

49. In our examination of the cost of production we shall confine ourselves to the figures submitted by three of the companies who gave evidence. The works costs of the Lucknow mill of the Upper India

The costs of three mills examined.

Couper Paper Mills Company are higher than those of the other mills using grass, and cannot be taken as typical, while the Deccan Paper Mills Company have not supplied us with any cost figures more recent than those of 1913-14. The works costs\* of the Titaghur Mills, the Bengal Mill and the India Paper Pulp Company have been tabulated in Appendix II and to these have been added the estimates submitted by all three Companies of the extent to which they believe their costs can be reduced when production approaches capacity. It is these figures which are examined in detail in this Chapter. The costs given are in each case average costs for all kinds of paper, and the cost of manufacturing any particular kind of paper can be estimated only approximately. This adds a little to the difficulty of the enquiry, but owing to the two facts that most of the paper produced by the Indian mills competes not with one kind of paper but with several, and that the writing and printing papers commonly made do not differ much either in cost or selling price, it is not so embarrassing as it might at first sight appear.

50. In the classification adopted at the outset of our enquiry, the term "primary raw materials" was defined as Primary Materials covering "the various products (e.g., grass, bamboo, rags, etc.) from which the fibre is obtained". Here there is a difficulty, because the cost of "primary materials" as given by the Titaghur and Bengal Mills in Appendix III includes rags, hemp, jute and waste paper as well as *sabai* grass, and both these mills were unwilling to disclose the prices paid to contractors for the former materials. In order to ascertain the cost of grass per ton of paper, it is necessary to examine the other evidence given by the mills.

51. The Titaghur Mills draw their supplies of grass from four different areas. The so-called "Western Cost of *sabai* grass—Circle" lies in the extreme north-west of the Sources of supply. United Provinces at a distance of about 920 miles from the mills. The quantity of grass which can be obtained from this area is said to be about 15,000 tons, but the actual quantity collected in recent years has been very much less—2,463 tons in 1922-23 and 1,944 tons in 1924-25. Grass is also obtained from Nepal, where the Company have received a concession from the Darbar, the distance from rail-head to the mill being 580 miles.

\*The costs of the Bengal Mill are for the calendar year 1923, and those of the other two mills for 1923-24 and the first six months of 1924-25.

The quantity obtainable is estimated to be 11,000 tons, and the quantity actually extracted was 4,255 tons in 1922-23 and 9,648 tons in 1923-24. The two remaining areas are Sahebganj in Bihar and Orissa and what is known as the "Eastern Circle" in the United Provinces and the Rewa State. The average distance of the grass fields from the mills is given as 230 miles, and if this figure is correct the great bulk of the grass must come from Sahebganj. The quantity of grass obtainable is estimated to be 15,000 tons, the actual quantity collected in 1922-23 was 7,637 tons and the estimated collections of 1924-25 are 11,000 tons. The Raniganj mill obtains its grass partly from the Ramnagar area, which is a portion of the Western Circle in the United Provinces sub-leased to them by the Titaghur Company, and partly from Chota Nagpur and the adjoining States. The Ramnagar area must be at least 800 miles from Raniganj, and the average distance of the Chota Nagpur grass fields cannot be much less than 200 miles. The quantities actually brought to the mills in 1923-24 were 1,858 tons from Ramnagar and 3,024 tons from Chota Nagpur.

52. The costs of the grass brought from different areas to the mills in 1923-24 have been tabulated in *Analysis of the cost of sabai grass at the mills* Appendix III and also the estimates furnished by the Titaghur Company of the probable costs if the fields were worked to capacity. The cheapest grass comes from the Sahebganj area which is nearer to the mills than any of the other fields, but no details of the cost have been given. In the remainder the expenditure has been classified under four heads, two of which vary according to the output and two do not. The cost of cutting, carting and baling lies between Rs. 22 to Rs. 26 a ton, and the railway freight is Rs. 9 a ton from the Chota Nagpur area and between Rs. 13 and Rs. 14 a ton from the other fields. No reduction is expected under the first head, and, as the mills have recently received substantial freight concessions from the Railways, the transport charges cannot be brought down much further. These two items together amount to between Rs. 35 and Rs. 40 per ton of grass. The balance of the cost falls under the heads of "royalty" and "miscellaneous", and both of these must be high when the output is low. In practically every case the mills do not pay a royalty calculated on the weight or quantity of grass extracted, but an annual rent which entitles them to as much grass as they can remove from a given area in a year, and the incidence of this charge therefore varies inversely with the output. In the Western Circle the Titaghur Mills pay Rs. 77,500 annually to the local Government, Rs. 1,00,000 to the original concessionaire who transferred the lease to them, and in addition are writing off preliminary expenses at the rate of Rs. 25,000 a year. They have been able by sub-leases to transfer part of the burden to other shoulders, but even so the royalty amounted to Rs. 47 per ton of grass, and when the full output is reached will still, it is expected, exceed Rs. 10 a ton. For the Nepal area the Titaghur Mills pay Rs. 80,000 annually to the Nepal Darbar, a charge which amounted to Rs. 9 per ton of grass in 1923-24

and would still be Rs. 8\* a ton with a full output. The Bengal Company pay Rs. 45,000 annually for their sub-lease of the Ramnagar area, and the incidence of this charge was nearly Rs. 24 per ton of grass in 1923-24. In the Chota Nagpur area the various rents paid amounted on the average to Rs. 9 a ton. The miscellaneous charges include the cost of the establishments which supervise the collection of grass in the fields, and other expenses, some of which vary with the output and some do not. The Titaghur Company expect that in the Western Circle the miscellaneous charges would fall from Rs. 26 to little more than Rs. 3 a ton with a full output, but in the Nepal area, where the grass is brought to rail-head by contractors, no reduction under this head is hoped for.

53. The average cost of the grass from all sources delivered at the Titaghur Mills was Rs. 60 a ton in 1922-23, and about Rs. 70 a ton in 1923-24, but was expected to fall to about Rs. 57 a ton in 1924-25. The average cost of the grass delivered at the Raniganj mill was slightly under Rs. 60 a ton in 1923-24. Before the war, in 1913-14, the average cost of grass delivered at the Titaghur Mills was Rs. 35 a ton, while the cost of grass to the Bengal Mill was a little higher at about Rs. 38 a ton. The increase in cost since before the war is approximately 60† per cent.

54. The cost of *sabai* grass to the mills during the last two or three years has been high, and it is of some importance to ascertain how far the increase is permanent and how far it is due to temporary or removable causes. Unquestionably the very high figure of Rs. 70 a ton which the Titaghur Mills had to pay in 1923-24 was abnormal and was due mainly to the fact that the output of grass from the Western Circle was very poor. Both the mills ascribe the low output to the very wet monsoons of 1922-23 and 1923-24; and Mr. Carr, in giving evidence for the Bengal Mill, referred to difficulties in the Chota Nagpur area, where the counter-attractions offered by the Tata Iron and Steel Company's works at Jamshedpur had drawn away the local labour. This particular obstacle, however, is a permanent one and cannot be regarded as a temporary feature. It was also suggested that in recent years the mills have required less than the normal quantity of grass, owing to their inability to sell more than about five-sixths of their full output of paper. The fact is undoubted, but it explains nothing for both the mills have been using more than twice the quantity of wood pulp which, according to their own statements, is needed for admixture with the grass in order to produce a satisfactory quality of paper. Their action might be ascribed to motives of economy if the imported wood pulp were appreciably cheaper than the pulp made from

\*The full output of the Nepal Circle was originally stated to be 11,000 tons, but at a late stage of the enquiry was given as 15,000 tons. No reason for this change was given and we have adhered to the original figure.

† The Titaghur figure of Rs. 70 a ton is abnormal and may be ignored. The increase is from Rs. 36.5 a ton to Rs. 60 a ton.

grass. But it is unnecessary at this stage to examine the point, for both the mills have assured the Board that they can manufacture as cheaply as they can purchase. In these circumstances it must be presumed that they used all the grass they could get, and the short collections must be ascribed either to causes beyond their control or to their own default.

55. Our consideration of the evidence leads us to think that the mills are not likely at any time to collect the quantity of grass they require for less than Rs. 50 a ton on the average. Under favourable conditions the cost might range from Rs. 50 to Rs. 55 a ton, and in unfavourable seasons would be higher. Rs. 50 per ton of grass is equivalent to Rs. 125 per ton of pulp or paper, and the distribution over the sub-heads might be very approximately as follows:—

	Cost per ton of grass.	Cost per ton of pulp or paper.*
	Rs.	Rs.
Cutting, carting and baling . . . . .	25	62.5
Railway freight . . . . .	10	25.0
Rent or royalty . . . . .	10	25.0
Other charges . . . . .	5	12.5
	—	—
	50	125

We shall discuss the cost of *sabai* grass on broader lines in Chapter V when we consider the natural advantages of the Paper industry in India.

56. The only primary material used by the India Paper Pulp Company is bamboo, but owing to the inadequacy of the pulp-making plant they are obliged at present to use a certain percentage of imported wood pulp. The cost per ton of bamboo delivered at the mill was given by the Company in their answers to the questionnaire as Rs. 50, with the remark that this figure could be much reduced when large scale extraction became possible. The Company have received a concession from the Government of Bengal covering a large area of bamboo at Kasalong in the Chittagong Hill Tracts, extending for 150 miles on both sides of the Karnaphuli river, the average distance from Chittagong being about 130 miles. The bamboo, when cut, is built into

\*The wastage which occurs in converting pulp into paper is made good by the weight of the sizing and loading which is added. This is not necessarily so, but appears to be approximately correct for the kinds of paper produced in India. See Appendix IV.

rafts and floated down the river to Jaitpura, about 14 miles upstream from Chittagong, and there for convenience of transport, is crushed and baled. The bamboo is conveyed to Chittagong in barges, and thence by rail and steamer to Naihati. The details of the cost given in a statement placed before the Board in July 1924 are as follows:—

	Cost per ton of bamboo.
	Rs.
Cutting . . . . .	15.00
Rafting to Jaitpura . . . . .	2.50
Crushing and despatch . . . . .	9.00
Boating to jetty . . . . .	2.52
Landing charges . . . . .	2.25
Railway freight to Naihati . . . . .	8.44
Siding charge . . . . .	0.11
	—
	39.82

To the above items, however, there are other charges to be added aggregating Rs. 44,000 in 1923-24. If these are divided by the quantity of bamboo extracted and sent to Naihati during the year, the figures are as follows:—

	Cost per ton of bamboo.
	Rs.
Rent of building at Jaitpura . . . . .	0.19
Chittagong staff and establishment . . . . .	5.97
Travelling expenses, etc. . . . .	3.62
Miscellaneous . . . . .	2.34
Royalty . . . . .	3.57
	—
TOTAL . . . . .	15.69

It will be seen that the actual cost at the mill of the bamboo brought from the Chittagong Hill Tracts exceeded Rs. 55 a ton, so that the India Paper Pulp Company had no great advantage over the grass mills so far as the cost of primary materials was concerned. The total quantity of bamboo used at the mill in 1923-24 was 4,847 tons, and about 2,000 tons must therefore have been obtained in the open market from other parts of Bengal.

57. The cost of the bamboo brought from Kasalong has proved

Reasons for the high cost of bamboo from the Kasalong reserve. disappointingly high, and is greatly in excess of the estimates made when the project was first mooted. The reasons for this

were discussed by the Company in a Note which is printed in the evidence. The high costs are due mainly to the fact that the quantity of bamboo extracted has never approached the quantity expected. It is not that there is any scarcity of bamboo; the quantity available for cutting within half a mile of the river bank is far in excess of the Company's needs, but the difficulty of securing the necessary labour has been very great. Considerable quantities of bamboo were brought down the Karnaphuli annually before the Kasalong concession was granted to the Company, and the local labourers are for the most part heavily indebted to the merchants who deal in the bamboo. The influence of the latter seems to have been freely exerted against the Company, and the difficulties have not yet been overcome. The effort to secure a larger output has necessitated the employment by the Company of a special staff under the control of a European officer, and expedients of this sort are necessarily expensive. A subsidiary cause which has tended to raise costs is the fact that the flood losses have proved far more serious than was anticipated.

58. The various items which go to make up the total cost of

Analysis of the cost of bamboo. bamboo landed at Naihati can be roughly classified under three heads. The first covers

the cost of cutting and rafting to Jaitpura, and amounts to Rs. 17.8 a ton. These charges would be about the same whatever the output. The second covers all charges incurred owing to the necessity of sending the bamboo to Naihati instead of utilising it in a mill at Jaitpura or Chittagong, and includes not only the transport charges proper, but also the crushing and baling. The total of these charges is about Rs. 22.5 a ton. Finally, the third head covers the miscellaneous charges, which would come down substantially with a higher output and would also be greatly reduced if the mill were at Chittagong instead of at Naihati. These charges aggregate Rs. 15.5 a ton. The first two heads do not call for detailed comment, but it is to be noted that the costs arising between Jaitpura and Chittagong account for 40 per cent. of the total, of which about half is the actual freight by boat, rail and steamer. These high transport charges obviously suggest a question which is more fully discussed in paragraph 78. The charges under the third head require a closer examination.

59. Under the concession granted by the Bengal Government,

Extent to which the cost of bamboo could be reduced. the royalty is *nil* for the first two years (1920-21) and only Re. 1 a ton for the next

10 years (January 1st, 1922 to December 31st, 1931) but the minimum royalty payable annually is Rs. 10,000, and the incidence was Rs. 3.5 a ton in 1923-24. If the extractions could be increased to 10,000 tons, there would be an imme-

diate saving of Rs. 2.5 a ton. The balance of the expenditure under this head almost all incurred on the special establishment employed at Jaitpura and Kasalong, and an increase of the extractions to 10,000 tons would automatically reduce the incidence by Rs. 11 a ton to Rs. 4.5. If the paper mill were at Chittagong instead of at Naihati, a smaller establishment would probably suffice and the expenditure of this kind might not exceed Rs. 3 per ton of bamboo. The reductions in royalty and miscellaneous charges would bring down the cost of Kasalong bamboo, landed at Naihati, by Rs. 14 a ton from Rs. 55 to Rs. 41. In their estimate of future costs the India Paper Pulp Company have taken a slightly higher figure of Rs. 45 a ton, which is said to be the actual cost at which bamboo can be landed, but apparently this figure is the cost of bamboo obtained elsewhere. The cost of bamboo delivered at a mill in the vicinity of Chittagong may be taken as Rs. 21.5 a ton, made up as follows:—

	Cost per ton of bamboo.
	Rs.
Cutting . . . . .	15.0
Rafting to Jaitpura . . . . .	2.5
Royalty . . . . .	1.0
Miscellaneous . . . . .	3.0
<hr/>	
<b>TOTAL</b>	<b>21.5</b>

In this estimate it is assumed that not less than 10,000 tons of bamboo will be extracted from the Kasalong reserve annually. The India Paper Pulp Company in their estimate of future costs have taken the cost of bamboo delivered at a Jaitpura mill as Rs. 18.5 a ton, no allowance being made for the miscellaneous charges. We have no doubt that these charges would be lower if the paper mill were at Jaitpura, but we do not think it safe to assume that the whole of the special establishment could be dispensed with.

60. The position as regards bamboo, in so far as it is disclosed in the evidence of the India Paper Pulp Company, may be briefly summarised. The Company have not yet succeeded in extracting more than a comparatively small quantity of bamboo in any year from the Kasalong reserve, and for this reason the cost of bamboo obtained from that source has been high. Even so, however, the cost delivered at Naihati in 1923-24 was lower by about Rs. 5 a ton than the average cost of the grass delivered at either the Raniganj or the Titaghur mills in that year. It seems likely that, given time and perseverance, the Company will succeed in bringing down the cost substantially, but probably not below Rs. 40

a ton. If the cost ranged from Rs. 40 to Rs. 45 a ton, bamboo would be cheaper by about Rs. 10 a ton than *sabai* grass is ever likely to be. Apart altogether from the Kasalong reserve, bamboo from other sources can be landed at Naihati at about Rs. 45 a ton, so long as the mills' requirements are limited to 2,000 tons or 3,000 tons in the year, but it does not follow that 10,000 or 12,000 tons could be obtained at the same figure, for the increase in the demand might raise the price. This point is of some importance. Sufficient *sabai* grass to keep one four-machine mill working could be obtained at between Rs. 45 and Rs. 50 a ton and it is the fact that three such mills have to be supplied which raises the cost above Rs. 50 per ton. Finally, it appears likely that when the initial difficulties have been overcome, bamboo from the Kasalong reserve could be landed in a mill on the Karnafuli river at a little over Rs. 20 a ton. A mill established there would have a great advantage in respect of raw materials.

61. The term 'auxiliary raw materials', as defined in the Board's *Auxiliary materials* questionnaire, includes "lime, all chemicals and dyes, consumable stores and generally all raw materials other than primary raw materials and purchased pulp." The India Paper Pulp Company use the sulphite process, while the grass mills use the soda process, so that at the pulp stage of manufacture the chemicals required are different. In the sulphite process sulphur and magnesia are the principal materials, but the India Paper Pulp Company have not disclosed any details either as to quantities or prices. The Bengal Company purchase part of the caustic soda they require, but they have also installed apparatus for the recovery of soda from the waste liquor of the digesters, and this soda is re-causticised with lime at the mill and is used again. The Titaghur Company have erected a similar plant at the Titaghur mill but not at Kankinara, and since the war they have also installed a special electrolytic plant for the production both of bleach and of caustic soda. As their answers to the questionnaire do not mention caustic soda as one of the materials purchased, it would appear that their whole requirements of this chemical can now be met from the soda recovery and electrolytic plants. After the pulp stage the chemicals used by all three mills are the same, subject of course to any differences there may be in the kinds and qualities of the paper produced. This applies to the colouring, sizing, and loading materials such as dyes, rosin, alum and china clay. But in the very important matter of bleach the Titaghur Mills stand apart. Both the other mills import bleaching powder, which deteriorates rapidly in a tropical climate, and the cost is heavy, exceeding Rs. 20 per ton of paper. But the Titaghur Company obtain the whole of their bleach from the electrolytic plant at Titaghur, and the bleaching liquor made there is also used at the Kankinara mill. From the figures which the Company placed before us privately we are satisfied that, after making a full allowance for depreciation and interest on the capital invested in the plant, a substantial reduction in the cost of bleach has been effected.

Auxiliary materials—  
Comparative costs.

62. The cost of auxiliary materials per ton of paper in all three mills was as follows in 1923-24:—

	Cost of auxiliary materials per ton of paper.	Rs.
Titaghur Mills . . . . .		93
Bengal Mill . . . . .		112
India Paper Pulp Company . . . . .		119

The fact that the India Paper Pulp Company showed the largest expenditure under this head is to some extent explained by the fact that only about 14\* per cent. of purchased pulp was used as against 35 per cent. in both the other Mills. It appears from the Company's estimates of future costs that 47 per cent. of the expenditure on auxiliary materials is incurred at the pulp stage, and it follows that, if the same percentage of imported pulp had been used at Naihati as in the other mills, the cost of auxiliary materials would have dropped to about Rs. 105 a ton. It is difficult, however, to make a direct comparison between the bamboo mills and the grass mills, owing to the different processes employed. The figures given by the Titaghur Mills and the Bengal Mill are comparable, since the percentages of purchased pulp used were almost identical, and the cost at Raniganj was higher by Rs. 19 a ton, which may be due in part to the railway freight on materials conveyed to Raniganj, but must be ascribed mainly to the electrolytic manufacture of bleach and caustic soda at Titaghur.

63. For the six months ending September 1924 both the Titaghur Mills and the India Paper Pulp Company show a marked reduction of expenditure under this head. At Titaghur the cost

per ton of paper fell from Rs. 93 to Rs. 73, and this improvement of Rs. 20 seems to have been due both to lower prices and to better results from the new electrolytic plant. At Naihati the reduction was from Rs. 119 to Rs. 95, and was due partly to lower prices and better practice, but mainly to an increase in the percentage of purchased pulp from 14 to about 30. In their estimate of future costs the Titaghur Mills anticipate a further decline in the cost of auxiliary materials to Rs. 62, but have given no explanation of the cause, and the Bengal Paper Mill Company have not attempted in their estimate to discriminate between primary and auxiliary materials. It is difficult, therefore, to forecast the reductions which the grass mills may be able to effect, but we do not think it safe to take a lower figure than Rs. 70 for the Titaghur Company, which makes its own chemicals, and Rs. 85 for the Bengal

\*The actual quantity of purchased pulp used has not been stated by the India Paper Pulp Company, and the figure of 14 per cent. has been arrived at on the basis of the cost at Naihati as compared with the cost at the other two mills.

Mill which does not. In both cases it is assumed that the percentage of imported pulp is 35, and if no such pulp were used the corresponding figures would be approximately Rs. 89 and Rs. 108. The India Paper Pulp Company estimate that, with bamboo as the sole material, the cost of auxiliary materials would be Rs. 106.

Total cost of materials.

64. The total cost of materials in the three mills in 1923-24 is tabulated below:—

	COST OF MATERIALS PER TON OF PAPER.		
	Titaghur Mills.	Bengal Mill.	India Paper Pulp Company.
	Rs.	Rs.	Rs.
Primary materials . . . . .	119	102	100
Purchased pulp . . . . .	106	100	40
Auxiliary materials . . . . .	93	112	119
<b>TOTAL . . . . .</b>	<b>318</b>	<b>314</b>	<b>259</b>

It will be seen that the India Paper Pulp Company has a very decided advantage over both the grass mills, but the comparison cannot be entirely fair unless allowance is made for the different percentages of purchased pulp. We estimate that the use of 35 per cent. instead of 14 per cent. of imported pulp would have increased the works cost of paper made at Naihati by about Rs. 5 a ton, and that the cost of materials would have been approximately as follows:—

	Rs.
Primary materials . . . . .	77
Purchased pulp . . . . .	100
Auxiliary materials . . . . .	105
<b>TOTAL . . . . .</b>	<b>282</b>

It will be seen that the advantage of the India Paper Pulp Company in the total cost of materials is reduced by Rs. 23, but, on the other hand, the lower cost of primary materials is fully brought out. In spite of all the difficulties experienced in obtaining a supply of bamboo, the primary materials were obtained at a cost per ton of paper lower than that of either competitor by Rs. 25 or more. This result is the more surprising because the grass mills, in addition to *sabai* grass, use cheaper materials such as rags, jute and hemp which are not used at Naihati.

65. The cost 'above materials' has been classified under four heads, of which the most important is power. Cost 'above materials'— Power and Fuel. The cost figures of the three mills for 1923-24 and the first half of 1924-25 compare as follows:—

	COST OF POWER AND FUEL PER TON OF PAPER.	
	1923-24.	April to September 1924.
	Rs.	Rs.
Titaghur Mills . . . . .	76	53
Bengal Mill . . . . .	69	...
India Paper Pulp Company . . . . .	57	58

The cost figures are not particularly informative until the consumption of coal is known, and it will be convenient to state the facts about each mill separately.

(1) The Raniganj mill of the Bengal Paper Mill Company is situated in the coalfields and its expenditure on power and fuel should be the lowest, but in fact this is not so. The average cost of the coal used in 1923 was a little over Rs. 9 a ton, and as the cost of power and fuel was Rs. 69 per ton of paper, the consumption must have been  $7\frac{1}{2}$  tons. This is admittedly a very high figure and Mr. Carr, who gave evidence on behalf of the Company, attributed the poor results to inefficient steam consumption and to slow running, caused by irregular attendance of workmen. In the answers to the questionnaire  $6\frac{1}{2}$  tons is given as the quantity of coal required for one ton of paper, and consumption at this rate is apparently regarded as normal. The coal used was partly first class Raniganj, which cost Rs. 11-6-0 a ton at the mill, and partly good second class coal from a colliery adjoining the mill. The latter coal is supplied under a contract by which the price depends on the price fixed for similar coal in the State Railway contracts, with the result that recently the mill has been paying Rs. 4 above the market price.

(2) The coal consumption at the Titaghur mills was 5.6 tons per ton of paper in 1923-24, and the expenditure on power and fuel was Rs. 76 per ton of paper, so that the average cost of coal landed at the mill must have been about Rs. 13.4 a ton. In the first six months of 1924-25 the coal consumption dropped to 5.1 tons per ton of paper, and the cost at the mill to a little over Rs. 10 a ton. The consumption at the two mills (Titaghur and Kankinara) was about the same, but in the former about half a ton of coal is used for the electrolytic and soda recovery plants, and

the practice at Titaghur was therefore better to that extent. This may be taken as the measure of the improvement effected by the modernisation of the steam-raising plant at Titaghur. The coal now used is said to be first class Jharia, costing Rs. 6 to Rs. 6-8-0 at the colliery.

(3) The consumption of coal in the Naihati mill of the India Paper Pulp Company was 5 tons per ton of paper in 1923-24, and the cost of the coal, landed at the mill, was about Rs. 11-6-0 a ton. For a short period in 1924 the consumption was as low as  $4\frac{1}{4}$  tons per ton of paper, but it has not been found possible to keep to this rate. The coal used is second class, and the cost at the mill was given in July 1924 as Rs. 10 a ton. As the cost of power and fuel per ton of paper was Rs. 53 in the six months April to October 1924, it would be seen that the coal consumption for the period was no better than in 1923-24. It may indeed have been worse, for, with more imported pulp, less coal was required.

66. It would be natural to compare the coal consumption of the Indian paper mills with the coal consumption in other countries, and particularly the Esparto mills in Great Britain, but in fact no direct comparison is possible. The information we have obtained suggests that in a mill using Esparto grass the consumption would be from  $1\frac{1}{2}$  to  $3^*$  tons per ton of paper, which suggests that the Indian coal consumption is much too high, even if allowance is made for the lower calorific value of Indian coal. The difficulty is to determine what exactly the British coal consumption means. Before the figures of a British mill could be compared with those of an Indian mill it would be necessary to ascertain what percentage of wood pulp was used in the former, whether any chemicals were manufactured in the mill, and whether, and to what extent, electric light and power was drawn from a public supply. In the absence of such details all that can be said is that, judged by British experience, the coal consumption in the Indian mills is higher than it need be, but it is not possible to determine the amount of the excess consumption. The question must therefore be examined from another point of view.

67. Of the four mills, the Naihati mill of the India Paper Pulp Company has naturally the most up-to-date steam equipment, and its coal consumption should be the lowest. The average consumption over any long period has not yet been brought below 5 tons per ton of paper, but for short periods has been as low as  $4\frac{1}{4}$  tons. At present, with a power unit designed for a mill of double the size, more coal is used per ton of paper than would be the case if a second machine were added, but, on the other hand, if the purchased pulp were dispensed with, more coal would be needed

---

\*Sir Willoughby Carey claimed that 4 tons of coal per ton of paper was quite good for a grass mill, but this claim is not supported by the evidence of other witnesses.

to make the additional pulp. On the whole we think that, if the capacity of the mill were increased from 2,500 to 5,000 tons of paper, it should be possible to reduce the coal consumption to  $4\frac{1}{2}$  tons of second class coal and even to  $4\frac{1}{4}$  tons, as the Company themselves anticipate. If the coal costs Rs. 9 a ton at the mill, the cost per ton of paper is Rs. 45 with a consumption of 5 tons, and Rs. 40 with a consumption of  $4\frac{1}{2}$  tons. It is fair, we think, to examine the coal consumption in the other mills in the light of these figures.

68. The coal consumption of the Titaghur mill has been brought down to 5 tons per ton of paper, which is the same as the consumption at Naihati in Titaghur and Raniganj. 1923-24.

It is true that half a ton of coal was used at Titaghur in making chemicals which are not made at Naihati, but no deduction can be made on this account in comparing the results at the two mills, for if only 14 per cent. of purchased pulp had been used at Titaghur instead of 35 per cent. an extra half ton of coal might have been required. It is to be remembered, moreover, that a rather better quality of coal is used at Titaghur, and that the mill there is a four machine mill designed as such, and not a one machine mill designed to permit the addition of a second machine with the minimum of expenditure. If allowance is made for these two facts the coal consumption at Titaghur from April to October 1924 is distinctly worse than the coal consumption at Naihati in 1923-24. It is possible that the sulphite process is more economical in coal than the soda process, and in that case the difference in steam efficiency might not be very great, but the evidence is not clear on this point. The Kankinara mill, where the steam-raising plant has not been modernised, is half a ton worse than Titaghur. Finally the coal consumption in the Raniganj mill, whether it be taken as  $6\frac{1}{2}$  tons or  $7\frac{1}{2}$  tons, is altogether excessive, and is probably due both to inefficient working, which Mr. Carr admitted, and to a steam-raising equipment which is not up-to-date.

69. Our general conclusion may be stated as follows. If there

Probable coal consumption and cost of power and fuel. are two mills, one using the sulphite process and one the soda process,\* and no purchased pulp is used in either, it should be possible with a reasonably up-to-date equipment to keep the coal consumption down to  $4\frac{1}{2}$  tons per ton of paper in the first mill and about 5 tons in the second. If 35 per cent. of purchased pulp were used in the latter,

\*It is assumed in this comparison that the coal consumption is half a ton higher per ton of paper in the soda process than in the sulphite process. The assumption cannot be justified by any definite statements in the evidence, but when the results attained in one process are tested by those reached in another, it is necessary to make an allowance for any factor which may give one of the two processes an advantage. Unless this is done, the standard set up may be unduly exacting.

†The consumption in a mill making its own chemicals would be higher, but not necessarily half a ton higher. The Titaghur mill makes chemicals both for itself and for the Kankinara mill.

the equivalent consumption of coal is about  $4\frac{1}{4}$  tons. The coal is assumed to be second class coal, such as is used at Naihati, and if the cost at the colliery is taken as Rs. 5-8-0 a ton, the cost per ton of paper would be approximately—

	Rs.
Naihati . . . . .	40
Titaghur and Kankinara . . . . .	45
Raniganj . . . . .	35

The rates of coal consumption we have suggested ( $4\frac{1}{2}$  tons for the sulphite process and 5 tons for the soda process) are not to be taken as final, or as indicating the lowest coal consumption possible under Indian conditions. It may well be that further improvements are possible. But we believe our figures are a fair estimate of what can be done, and indeed of what is already in sight. If the cost of power and fuel in any paper mill is substantially above these figures, either its working is not fully efficient or its steam equipment is out of date.

70. In their estimate of future costs the India Paper Pulp Company have assumed a consumption of only 3 tons of coal per ton of paper, and it is necessary to explain exactly what this figure means and how it was arrived at. Of the many mills on the Hooghly, some use first class coal and others second class coal, and experience shows, it is said, that the cost of steam-raising does not vary much whichever class of fuel is employed. The relation between the price of first class coal and the price of second class coal is such that, at about 150 miles from the coalfields, the higher cost of the one is off-set by the larger consumption of the other. The price of second class coal at Naihati is Rs. 9 a ton and of the best Sibpur coal Rs. 12-8-0, and it follows by a simple arithmetical calculation that of steam-raising is about the same whether first class coal or second class coal. It will be seen that the estimate is based on theory and not on actual practice, and obviously everything depends on the initial assumption that, in the neighbourhood of Calcutta, the cost of steam-raising is about the same whether first class coal or second class coal is used. But the argument appears to us to be reasonable, and certainly the Managing Agents of the India Paper Pulp Company (Messrs. Andrew Yule and Company) must be fully acquainted with the facts in a matter of this kind. The estimate has no bearing on the cost of paper manufacture on the Hooghly, but it becomes of great importance in connection with the probability that mills may be erected for the manufacture of paper out of bamboo in the vicinity of the raw materials and at great distances from the coalfields. Unless the coal consumption can be kept down to about 3 tons per ton of paper, such mills would apparently be at a disadvantage in competition with mills near Calcutta.

Cost above materials—  
Labour.

71. The following statement compares the cost of factory labour per ton of paper in the three mills:—

	COST OF FACTORY LABOUR PER TON OF PAPER.	
	1923-24.	April to September 1924.
	Rs.	Rs.
Titaghur Mills . . . . .	77	74
Bengal Mill . . . . .	71	...
India Paper Pulp Company . . . . .	66	61

In both the Titaghur Mills and the Bengal Mill, labour costs were high, owing to the fact that they were manufacturing at about five-sixths of capacity. With a full output the labour cost would have been in the neighbourhood of Rs. 60 a ton. It is satisfactory to find that in a new mill, which has hardly passed out of the experimental stage, the India Paper Pulp Company have succeeded in bringing the cost of labour down to about that figure. When the second machine is added the Company believe that the labour cost can be brought down to Rs. 45 per ton of paper. The Titaghur Mills and the Bengal Mill are less sanguine, the estimated future costs, given a full output, being put at Rs. 58 and Rs. 64 a ton respectively. The impression left on our minds, both by the evidence taken and by our visit to the mills, is that a higher level of efficiency has been reached at Naihati than elsewhere, and we think it should be possible, given a full output, to reduce the labour cost per ton of paper at any rate to Rs. 50 a ton. The expenditure under this head does not call for further comment here, but we shall discuss in Chapter V the proportion of European employees in the mills.

72. The cost of repairs and maintenance of buildings and machinery per ton of paper for the three mills is given in the following table:—

	COST OF REPAIRS AND MAINTENANCE PER TON OF PAPER.	
	1923-24.	April to September 1924.
	Rs.	Rs.
Titaghur Mills . . . . .	53	52
Bengal Mill . . . . .	42	..
India Paper Pulp Company . . . . .	41	31

The cost of repairs and maintenance was abnormally high at Titaghur, owing to the process of renovation the mills have been

undergoing, and was higher at Naihati than might be expected in a new mill, were it not that part of the plant is designed for double the present output. The figure given by the Bengal Mill seems approximately normal for a mill that has been working for some time, but with a full output it should drop from Rs. 42 to Rs. 35 a ton.

73. The last head—"General and miscellaneous"—includes expenditure on the local management and supervision, general services and all items which cannot conveniently be accounted for under another head. No detailed discussion is possible. The figures for the three Companies are—

	General and miscellaneous expenditure per ton of paper.
	1923-24.
	Rs.
Titaghur Mills . . . . .	17
Bengal Mill . . . . .	23
India Paper Pulp Company . . . . .	33

In this case the figures for the first half of 1924-25 have not been given, as a recent change in the method of accounting adopted by the India Paper Pulp Company vitiates the comparison. The expenditure under this head is naturally highest in the one-machine mill at Naihati. With a full output "General and miscellaneous" costs should not exceed Rs. 15 per ton of paper.

74. We are now in a position to compare Total Works Costs. the "cost above materials" for all three Mills. The figures are as follows:—

	COST ABOVE MATERIALS, 1923-24		
	Titaghur Mills.	Bengal Mil.	India Paper Pulp Company.
Power and fuel . . . . .	Rs.	Rs.	Rs.
Power and fuel . . . . .	76	69	57
Labour . . . . .	77	71	66
Repairs and Maintenance . . . . .	53	42	41
Miscellaneous . . . . .	17	23	33
Total . . . . .	223	205	197

It will be seen that the costs of the India Paper Pulp Company were slightly lower than those of the Raniganj mills and considerably lower than those of the Titaghur mills, but in fact the comparison is even more favourable than the figures show. In paragraph 64 the cost of materials at Naihati was adjusted so as to permit of a fair comparison with the grass mills, and the result

was to raise the cost of materials by Rs. 23 a ton. A corresponding deduction must now be made from the cost above materials, but, as the use of more imported pulp would have raised the cost of paper by Rs. 5 a ton, the amount to be deducted is only Rs. 18. The cost above materials at Naihati then falls from Rs. 197 to Rs. 179. The full comparison of the works costs per ton of paper is then as follows:—

	COST PER TON OF PAPER 1923-24.		
	Titaghur Mills.	Bengal Mill.	India Paper Pulp Company.
	Rs.	Rs.	Rs.
Cost of materials . . . .	318	314	282
Cost above materials . . . .	223	205	179
Total . . . .	541	519	461

It will be seen that, if the Bengal Mill is chosen for purpose of comparison, the India Paper Pulp Company has an advantage of Rs. 32 per ton in respect of materials and of Rs. 26 a ton in the cost above materials. We are aware that these calculations are only approximate, and must not be pressed too far, and for this reason we have not applied the adjustment to the sub-heads, but only to the total cost above materials. But it seemed necessary, if the figures were to be compared at all, to make some attempt to bring them to a common level, since otherwise it was impossible to determine where exactly the advantage lay.

75. Before discussing the overhead charges it is desirable that we should review the estimates which all three Companies have made of the extent to which their works costs can be reduced when they are manufacturing to capacity. Of these, the estimate of the Bengal Mill was put forward rather as a calculation of what their costs might be under existing conditions, provided the output approached 8,000 tons, than as an estimate of future costs. The cost of materials is brought down from Rs. 314 to Rs. 300 per ton of paper, on the basis that the percentage of imported pulp is cut down by a half. No allowance is apparently made either for a reduction in the cost of grass, for a fall in the price of auxiliary materials or for greater economy in their use. The cost above materials is brought down from Rs. 205 per ton of paper to Rs. 159. The cost of power and fuel is put at Rs. 45 instead of Rs. 69, the assumption being that the coal consumed will be 6 tons, at Rs. 7.5 a ton, per ton of paper. This estimate implies a very moderate standard of efficiency, and if it cannot be bettered, the steam equipment of the mill must be out of date. Repairs and maintenance are expected to fall from Rs. 42 to Rs. 31, which is a lower figure than

Estimate of reduced costs  
at Raniganj.

the higher output would account for. Only proportionate reductions of Rs. 7 and Rs. 4 are expected under 'labour' and 'general and miscellaneous'. The total works costs come down by Rs. 60 per ton of paper from Rs. 519 to Rs. 459. Half the decrease is accounted for by a reduction in the price of coal, a lower fuel consumption, and a real but small saving in the cost of repairs, and the balance would automatically follow the increase in output.

76. The Titaghur Paper Mills Company have put forward two

Titaghur estimates of costs which the first shows what their future costs.

April to October 1924—if the output during

the period had been 9,000 tons instead of about 7,500. The only items affected are 'labour' and 'repairs and miscellaneous', and the reductions are arrived at arithmetically. The net result is to bring down the works costs from Rs. 492 to Rs. 468, *i.e.*, by Rs. 24 a ton. The second estimate is for the future, and indicates what the Company believe can eventually be done. This estimate compares as follows with the actuals for April to September 1924:—

*Cost per ton of paper.*

	April to September 1924.	Estimated future costs.
	Rs.	Rs.
Cost of materials . . . . .	299	233
Cost above materials . . . . .	193	154
Total works cost . . . . .	492	392

The total reduction expected is Rs. 100 per ton of paper, of which Rs. 61 occurs under 'materials'. The reduction under the three sub-heads is:—

	Rs.
Primary materials . . . . .	34
Purchased pulp . . . . .	16
Auxiliary materials . . . . .	11

Unfortunately the Company have not stated what percentage of purchased pulp the estimate assumes, or what the landed price is taken to be, and it becomes difficult to examine the details, but as the rise in the rupee sterling exchange from 1s. 4d. to 1s. 6d. would in any case account for a fall of Rs. 11 in the cost of imported pulp, it seems most probable that the percentage is still taken at about 35. On that basis, primary materials at Rs. 90 per ton of paper would mean grass delivered at the mill at about Rs. 55 a ton, which is a reasonable figure. No explanation of the reduction in the cost of auxiliary materials has been given, and, as the Titaghur mills are already much below the other mills under this head, it is doubtful whether the expectation is well founded. The Company

expect that the cost of materials will come down to Rs. 238 per ton of paper, but Rs. 250 would be a safer figure and, we believe, is a possible one. The estimated reduction in the cost above materials presupposes a small economy in coal consumption (Rs. 3), a slight improvement in labour efficiency (Rs. 3), and a 20 per cent. reduction in repairs and maintenance (Rs. 9), which may or may not materialise. The balance of the reduction arises automatically from the increase in output. The total works costs could, we think, be brought down below Rs. 420 per ton of paper on the average over a series of years, but is not likely to fall below Rs. 400, save in exceptionally favourable season when the cost of grass is low.

77. The India Paper Pulp Company have submitted estimates

The India Paper Pulp of their future costs, both in the existing mill Company's estimate of at Naihati, if a second machine were added, future costs.

and in a similar mill assumed to be erected at Jaitpura on the Karnaphuli river near Chittagong. They have also shown separately what the costs would be according as the output of the mill was 5,000 or 5,500 tons a year. It is the Naihati estimate for an output of 5,000 tons which we propose to examine in detail. The estimate compares as follows with the works costs of 1923-24:—

*Works costs per ton of paper.*

	Actuals 1923-24.	Estimated future costs.
	Rs.	Rs.
Materials . . . . .	260	213
Cost above materials . . . . .	197	136
Total . . . . .	457	349

The cost of bamboo is taken at Rs. 107 per ton of paper, which is equivalent to Rs. 45 per ton of bamboo. This is the actual cost at which bamboo can be landed at Naihati at present and is a conservative figure, for, if the Company succeed in working up the output of the Kasalong reserve to 10,000 tons or more, the cost of bamboo at Naihati should be lower than this. The probable cost of auxiliary materials is taken at Rs. 106 per ton of paper, and the Company remark that the quantities of chemicals required have been taken from the working of the Naihati mill during 1924-25, and the prices are those which they have actually paid. If that be so, the estimate is practically equivalent to recent costs, but in fact some allowance seems to have been made for improvement in practice. The cost of auxiliary materials in the 6 months, April to October 1924, was Rs. 93 per ton of paper, and the percentage of imported pulp was about 30. The equivalent cost, if no imported pulp had been used, would be about Rs. 115 per ton of paper. A

reduction to Rs. 106 ought to be quite feasible, when more experience has been gained of the sulphite process as applied to bamboo. The cost above materials is expected to fall by Rs. 61 per ton of paper, and the reductions under the sub-heads are:—Power and fuel—Rs. 19, Labour—Rs. 21, Repairs—Rs. 11, Miscellaneous—Rs. 10. The figure taken for power and fuel (Rs. 38) assumes a coal consumption per ton of paper of  $4\frac{1}{4}$  tons of second class coal at Rs. 9 a ton, or 3 tons of the best Sibpur coal at Rs. 12.5 a ton. This is better than any Indian mill has yet done in practice, even for short periods,\* but we think that the cost could be brought down at any rate to Rs. 40 per ton of paper when the second machine is added and the power unit can be worked to full capacity. The cost of labour (Rs. 45) is based, the Company state, on the hands actually employed in the mill, and they are satisfied they will be able to work to it in practice. It is, nevertheless, 25 per cent. better than the lowest cost yet achieved, and may possibly prove to be an oversanguine estimate. The cost of 'repairs' is taken at Rs. 30 per ton of paper, the actual cost in the first six months of 1924-25 was nearly as low as this, but the cost under this head will tend to rise as the mill grows older. The reduction of Rs. 10 under 'miscellaneous' would naturally result from the doubling of the output. On the whole, the estimate seems to be a fair one, and does not exaggerate the economies likely to be made. But it may be safer to rise the allowances for 'labour' and for 'repairs' by Rs. 5 in each case, and the total works costs would then be Rs. 360 per ton of paper.

78. The estimate of what the works costs are likely to be in a mill erected on the Karnafuli river is of some importance, as it throws a good deal of light on the question whether it is better that a paper mill should be near the coalfields or

near the raw materials. The two chief differences from the Naihati estimate are that the cost of primary materials goes down from Rs. 107 to Rs. 44, while the cost of power and fuel rises from Rs. 38 to Rs. 67. All the other heads are somewhat higher, and the total works costs amount to Rs. 328 per ton of paper instead of Rs. 349. Of this advantage of Rs. 21 a ton, which a mill at Chittagong might possess, about a half is swallowed up in freight, because the paper must be brought to Calcutta or some other large market before it can be sold. Also the capital cost of a mill near Chittagong would be rather higher than at Naihati, and the consequent increase in the overhead charges makes further inroads on the balance. In the end, the advantage is no more than Rs. 7.5 a ton, and we believe it is more apparent than real. The cost of primary materials is taken at Rs. 44, on the assumption that bamboo can be landed in the mill at Rs. 18.5 a ton. As we have already said (paragraph 59), we do not consider it safe to assume that the special establishment could be entirely dispensed with, and the

\*When the Company reduced their coal consumption to  $4\frac{1}{4}$  ton for a short period in 1924, they were using about 30 per cent. of imported pulp.

figure we took as the cost of bamboo at Jaitpura was Rs. 21.5. The effect is to raise the cost of primary materials per ton of paper from Rs. 44 to Rs. 51, and the advantage is wiped out. In the second place, the possibility that manufacture near the raw materials would be cheaper than manufacture near the coalfields rests entirely on the assumption that, by using only the very best coal, the consumption can be kept down to 3 tons per ton of paper. This has never yet been done in India, and a difference of half a ton would suffice to transfer the advantage to the other side. We now turn to the overhead charges.

79. It has proved somewhat difficult to ascertain from the

**Overhead charges—Head Office expenses and remuneration of Managing Agents.** various figures supplied by the Companies what exactly they consider a fair allowance for the Head Office expenses and the remuneration of the Managing Agents. Indeed,

the Titaghur Company in the final statement of their claim have to all appearance omitted any provision for this item, for the head of expenditure which is supposed to include it proves on analysis to be made up of freight and selling and distribution charges. The Bengal Paper Mill Company estimate that their Head Office expenses amount to nearly Rs. 12 a ton, excluding the remuneration of the Agents. On the whole, we think that an allowance of Rs. 15 a ton under this head should suffice. If the out-of-pocket expenses are taken as Rs. 12 a ton, there is a balance of Rs. 3 which, on a ten thousand ton mill, would mean a monthly allowance to the Agents of Rs. 2,500. The figure we have taken appears to agree closely with the claims put forward by the Bengal Mill and the India Paper Pulp Company, though these were arrived at in quite different ways. In our estimate of the cost of production of steel at Jamshedpur we provided for the Agents' commission calculated as a percentage of the profits, but further consideration leads us to think that this is not necessary. We agree with Sir Thomas Catto, who gave evidence on behalf of the India Paper Pulp Company, that the only question to be considered is what is a reasonable remuneration for the work done.

80. Various estimates were made by the Companies of the

**Overhead charges—Interest on working capital.** working capital required by a paper mill in India. The Bengal Paper Mill Company consider that with their present output (6,500 tons) they require Rs. 15 lakhs as working capital, and with an output approaching 8,000 tons, Rs. 17 lakhs. These sums are equivalent to Rs. 231 and Rs. 213 for each ton of output. The Titaghur Company estimate that, with their present output of 15,000 tons, they require Rs. 60 lakhs as working capital—equivalent to Rs. 400 per ton—and with a full output, Rs. 70 lakhs, which would mean Rs. 350\* per ton. The India Paper Pulp Company consider that with their present output of 2,500 tons a year,

\*At the time the estimate was made, the Company took the full output to be 20,000 tons a year. Subsequently this figure was reduced to 18,000 tons.

the working capital needed is Rs. 10 lakhs or Rs. 400 per ton, but when the output is doubled by the addition of a second machine, they think that Rs. 14 lakhs would suffice, which would be about Rs. 280 per ton. We have found in our enquiries that the estimate made by any manufacturing concern of the working capital it requires is always affected by its own financial circumstances at the time, and these may be wholly irrelevant to the real issue. After considering the evidence given as to the stocks of materials and goods usually held and the period which elapses between delivery and payment, we think that the cost of eight months' output is a fair measure of the working capital required, and this would mean about Rs. 270 per ton of output. The rate of interest payable may be taken at  $7\frac{1}{2}$  per cent. on the average, and the incidence per ton of output would be Rs. 20.

81. Before the proper allowance for depreciation can be estimated

Capital expenditure involved in the establishment of a paper mill in India.

it is necessary that a reasonable capitalisation for a paper mill in India should be determined. In this matter little help can be derived from the capital accounts of the existing mills. The Raniganj mill and the Titaghur mills were erected long before the war and in both cases the block accounts have been heavily written down, either out of war profits or by reconstruction or both. The India Paper Pulp Company, on the other hand, purchased its plant and machinery after the war at a time of very high prices, and much of the equipment was designed to admit of the addition of a second machine. In these circumstances we have to fall back on the estimates placed before us by all three Companies. The Bengal Paper Mill Company estimate that the present-day cost of a mill similar to their mill at Raniganj would be Rs. 60 lakhs for buildings and machinery, which would mean about Rs. 750 per ton of output. These figures are based on an estimate actually worked out in 1923. Sir Willoughby Carey, giving evidence for the Titaghur Mills, stated that according to estimates very recently prepared it would cost £600,000 to replace either of the Titaghur Mills, and about half of this sum would be the cost of imported plant and machinery, and the balance expenditure incurred in India. With the exchange at 1s. 6d. to the rupee, the total cost would be Rs. 85 lakhs. If the output of one mill is taken as 9,000 tons, the fixed capital expenditure per ton of output is Rs. 944, but a modern 4-machine mill should be capable of producing 10,000 tons a year without difficulty, and the estimate may be taken as Rs. 850 per ton of output. The India Paper Pulp Company estimate the present-day cost of a 2-machine mill at Naihati as Rs. 45 lakhs. If the output be taken as 5,000 tons, the fixed capital expenditure per ton of output is Rs. 900 or if 5,500 tons is taken, Rs. 820. We have considered the evidence on the point and we do not think it is possible to take the fixed capital expenditure required at less than Rs. 800 per ton of output. We are aware that lower figures than this have been put forward at different times by various authorities. But we feel that in a matter of this kind special weight must be given to the evidence of those witnesses

who have long experience of existing mills or have recently been connected with the actual erection of a mill in India.

82. The rates of depreciation allowed by the Income-Tax Department in paper mills are  $2\frac{1}{2}$  per cent. on overhead charges—buildings and  $7\frac{1}{2}$  per cent. on machinery. Depreciation. Taking into account the relative magnitude of these two classes of expenditure, the rates work out very nearly to  $6\frac{1}{4}$  per cent. on the average. If Rs. 800 is the fair capitalisation per ton of output, the charge for depreciation is Rs. 50 on every ton of paper produced. The total of the overhead charges is therefore as follows:—

	Rs.
Head Office expenses and the remuneration of the Managing Agents . . . .	15
Interest on working capital . . . .	20
Depreciation . . . .	50
<b>TOTAL . . . .</b>	<b>85</b>

83. It was urged in the course of our enquiry, and particularly Fair return on capital. by the representatives of the India Paper Pulp Company, that capital could not be attracted to a new industrial enterprise in India even by the prospect of a 10 per cent. return on the capital invested. Investors discounted heavily the confident anticipations of the prospectus, and would not expect to receive 10 per cent. unless the projectors of the enterprise would hold out hopes to them of 15 or even 20 per cent. If this be so, a somewhat difficult problem may arise when the amount of protection needed to secure the rapid development of an industry falls to be determined. For the moment, however, this difficulty need not delay us. Having regard to the conditions prevailing in India, we think that any industry returning 8 per cent. on the capital invested in it over a period of years would be reasonably successful and would stand in no need of protection. This is the result which the Paper industry must eventually achieve if it is to become firmly established. It follows that the selling price of paper per ton must be high enough to include a provision of Rs. 64 to cover the return on the capital invested.

84. The results reached in this Chapter may be very briefly summarised. The lowest works cost at which paper has been made in India since the war by the mills using grass as their staple material is Rs. 490 a ton. The high costs are due in part to the fact that the mills have been working only to five-sixths of capacity, and if a full output could be attained, the works costs could be brought down to Rs. 460 a ton. Further economies are possible, and in course of time the works costs in a reasonably equipped mill near Calcutta or in the coalfields might be reduced to some figure below Rs. 420 but not below Rs. 400 a ton.

Summary of Board's conclusions regarding costs of production.

The manufacture of paper from bamboo is a novelty in India and the lowest works cost attained by the pioneer firm is Rs. 440 per ton. It does not appear likely that the works costs can be brought much lower so long as the mill, though designed for two machines eventually, possesses only one. But, if a second machine were added, it is probable that in the course of four or five years the costs could be brought down to Rs. 360 per ton. Any mill established after the war must be prepared to meet overhead charges amounting to Rs. 85 per ton, while the return of capital will require Rs. 64 a ton, so that the total addition to the works costs is Rs. 150 a ton in round numbers. These are the figures which must be borne in mind when the ability of the industry to dispense with protection eventually is considered in Chapter V.

## CHAPTER IV.

### Proposed protective duty on imported pulp.

85. The proposal for the imposition of a protective duty of 20 per cent. on imported pulp was put forward <sup>Anticipated shortage of wood for pulping.</sup> by the India Paper Pulp Company, which, as its name implies, was established originally with the object of manufacturing paper pulp from bamboo for export, or for sale to the paper mills in India. For a number of years past European paper makers have been apprehensive of an impending shortage of wood for conversion into pulp, and consequently of a serious rise in the cost of pulp and paper. Wood displaced grass as the raw material for all the commoner kinds of paper, because the supplies were far more abundant and the cost much less, but there is this great disadvantage in the use of wood, as compared with grass, that, while grass renews itself annually, it may take 30, 40 or even 60 years before a second crop of timber can be taken from a cleared forest area. Wood cannot permanently hold its place as the staple paper-making material unless steps are taken to maintain the supplies, and re-afforestation proceeds *pari passu* with destruction. But it is notorious that, except perhaps in Sweden, the areas replanted have been wholly inadequate to replace wastage, and the industry has been faced with the prospect of steadily dwindling supplies and rising costs. Most serious of all was the devastation worked during three-quarters of a century in what at one time appeared to be the inexhaustible resources of the United States of America. That country is far the most important market for paper in the world, and in recent years it has become a heavy importer of pulp, not only from Canada but also from the Baltic countries. In the Dominion of Canada the quantities of standing timber in the forests are still enormous, but anxiety has been growing, owing to the rapid depletion of the coniferous woods, not only by the increasing demands of the pulp and timber industries, but also by the ravages of forest fires and insect pests. Indeed, the example of the great country to the south of the Dominion conveyed a warning which could not well be ignored.

86. In the circumstances it was natural that the thoughts of paper makers all over the world should increasing-  
<sup>Proposed manufacture of paper pulp from bamboo.</sup> ly be turned to the problem of finding an alternative source of fibre against the day when wood became too expensive. The material must be abundant, for otherwise paper could not be cheap; for the same reason it must not be in constant demand for other purposes but rather of the nature of a waste product, and it must, if possible, be one which renews itself at short intervals and does not require the lock-up of capital involved in re-afforestation with slow growing trees. It is at this point that bamboo came prominently to notice. It grows in great abundance in many parts of the tropical zone, and though in densely

populated areas the demand for other purposes might make it too expensive for the paper maker, there are immense and sparsely populated tracts where it grows luxuriantly. Above all, it reproduces itself automatically after 3, 4 or 5 years and there is no need for special cultivation. A great deal of research work has been done in recent years to test the possibilities of the bamboo, and, amongst others, by Mr. James L. Jardine of Penicuik, Scotland, working in conjunction with the firm of Thomas Nelson and Sons, Edinburgh. The process devised by Mr. Jardine is an adaptation of the well-known sulphite process for manufacturing wood pulp, and it was for the manufacture of pulp by this process that the India Paper Pulp Company was established in 1918. What the Company contemplate is that the industry should supply, in the first instance, the needs of the Indian mills, who at present mix a considerable amount of wood pulp with the grass pulp they manufacture, and eventually, as costs go down and the price of wood pulp rises, should develop an export trade to all parts of the world. It is in pursuance of these objects that the proposal for a protective duty on imported wood pulp has been put forward.

87. In justifying the imposition of the duty the India Paper

Reasons advanced for a Pulp Company naturally lay great stress on protective duty on wood the diminution of the world's supplies of pulp.

coniferous woods, and the prospect that the manufacture of bamboo pulp may become a very considerable industry. They point out that, so long as the Indian manufacturer is dependent on foreign supplies of an essential raw material, the position of the Indian paper maker is precarious, and the industry is not firmly rooted in the soil. They contend that, since bamboo pulp is equal, if not superior, to wood pulp in every quality which the paper maker demands, the importation of wood pulp is unnecessary. The Pulp industry, it is claimed, fully satisfies the conditions laid down by the Fiscal Commission, and would develop rapidly if protection were given. If, however, protection is refused, the industry may be stifled at the start, and the manufacture of paper from bamboo would then find a home in other countries rather than in India.

88. Wood pulp is at present admitted into India duty-free, and

Attitude of the grass mills to the proposed duty the first effect of the imposition of a 20 per cent. duty on imported pulp would be to raise on paper pulp.

the costs of the paper mills which use grass, and a conflict of interests might be expected to arise. Both the Bengal Paper Mill Company and the Titaghur Paper Mills Company, however, acquiesced in the proposal. "We feel," said the former Company in their answers to the Board's questionnaire, "that our arguments in favour of protecting the Paper industry would be considerably weakened were we to object to an increase in the duty on pulp. Protected paper and free pulp would likely lead to the establishment of a Paper industry based on foreign material, and this is not in the interests of the country." Both mills, however, asked that the collection of the duty might be post-

poned for two years after the passing of the Act by which the duty was imposed, so that they might have an opportunity of making the necessary arrangements to manufacture bamboo pulp themselves. The India Paper Pulp Company are opposed to the postponement of the duty for more than a short period of six months, and would prefer that it should take effect immediately.

89. The two objects which the advocates of protection for paper prospects of the export pulp have in view are to free the Indian of bamboo pulp from India Paper industry from dependence on foreign in the future. materials, and to develop eventually an export

trade in bamboo pulp. It is, perhaps, not unfair to say that from the point of view of the India Paper Pulp Company the first is only a stepping stone to the second. It is at any rate clear that, but for the threatened exhaustion of the wood supplies of Europe and America, the Company would not have been established at all, and the question of protection for pulp would not have arisen. For this reason it is the prospects of the export trade that we shall consider first. We have studied the literature bearing on the question of the available supplies of timber for pulping, and we think it is established beyond question that a rapid process of depletion is going on, which must eventually be a very serious business for the paper maker. It is certain that re-afforestation lags far behind the wastage, and it appears to be very doubtful whether, in a country like Canada, re-afforestation on an adequate scale is feasible at present. It might indeed be possible to prohibit by legislation annual cuttings in excess of the replanting effected during the year, but the immediate result would be to precipitate the crisis, for the supplies of timber on the market would at once be drastically reduced. It is inevitable, we believe, that, as time goes on, the more easily accessible forests should be worked out, and that the pulping wood should be drawn from more and more distant sources. If that be so, the cost of wood pulp will tend constantly to rise and will eventually reach a point when the competition of the materials for paper making will become formidable. When that happens it may well be that the manufacture of bamboo pulp will become a very important industry, and one in which India may expect to take a considerable share. To this extent we think that the claim of the India Paper Pulp Company has been made good. There is, however, more to be said.

90. The proposal to which the assent of the Government of India and the Legislature is sought is one which can operate only by raising the cost of materials to the paper maker, and consequently the cost of paper to the consumer. A scheme of this kind requires special justification when the object in view is the ultimate development of an export trade and not the satisfaction of the country's own needs. Such a justification might, perhaps, be found if it could be shown that the exhaustion of the world's timber supplies had reached a point when a substantial increase in the cost of wood pulp could no longer be deferred. It is at this point that

the evidence fails. There are widely discrepant estimates of the quantities of wood still available for pulping and of the time that must elapse before they are worked out. It is precisely one of these cases in which the nervous apprehensions of some, and the eager expectations of others, are likely to prove exaggerated. A shortage in the supply of wood for pulping may be quite inevitable, but it may easily happen that the prophets are wrong in their forecast of the date by five, ten or even fifteen years. No evidence has been placed before us which entitles us to say that a large increase in the cost of wood pulp is so imminent that export of bamboo pulp becomes a possibility of the near future. Nor are we greatly moved by the India Paper Pulp Company's fear that India may lose the start in the race, and that the bamboo Pulp industry will establish itself elsewhere. Whatever danger of that kind there may be, there is an equal risk on the other side of a premature development, which might be very expensive to the country. The fingers that are first in the pie may pick out the plums, but they are apt to get burnt in the process. The development of an export trade in bamboo pulp may very well be left to look after itself in due season, and we do not think it is a factor which should influence the decision of the Government of India on the question whether a 20 per cent. import duty should be placed on imported wood pulp now.

91. It will be convenient at this stage to refer briefly to the evidence bearing on the cost of manufacturing bamboo pulp in India. The India Paper Pulp Company in their answers to the Board's questionnaire gave the works cost of bamboo pulp at Naihati in 1923-24 as Rs. 265 a ton, but it is impossible to separate the cost of the pulp stage of manufacture from the subsequent processes without some arbitrary method of allocating the common charges, and as the India Paper Pulp Company only manufacture pulp for their own use and not for sale, they have no particular motive at the moment for attempting to ascertain the cost of pulp with extreme accuracy. The figure of Rs. 265 a ton must, therefore, be taken as approximate, but it is sufficiently accurate to make it certain that there can be no question of export until the costs are a great deal lower than they have ever been at Naihati. It is necessary, therefore, to consider the estimates of the cost of manufacturing pulp which have been placed before us. One was prepared by the India Paper Pulp Company for a 6,000 ton mill at Jaitpura near Chittagong, which would use the bamboo floated down the Karnaphuli river from Kasalong. The other was prepared by Mr. William Raitt, the Government Cellulose Expert, for a mill at Cuttack to utilise bamboo floated down the Mahanadi from Angul and the Feudatory States of Orissa, and figures are given both for a 5,000 ton mill, and for a 10,000 ton mill. These estimates have been tabulated in Appendix V, and in order to avoid overloading the text of the Report with figures, the details of the cost have been examined in a separate Note attached to the Table.

92. Our examination of the estimates leads us to believe that a

Price at which it would be possible to ship pulp for export. 10,000 ton mill, whether erected at Cuttack or at Chittagong, should be able, after four or five years' working, when the initial difficulties had been overcome, to ship pulp for ex-

port at Calcutta and Chittagong respectively at about Rs. 220 a ton f.o.b., after meeting all costs and paying a return of 8 per cent. on the fixed capital. The basic assumption is that bamboo can be landed at either mill at a cost of about Rs. 21.5 a ton. In both projects the bamboo grows on the banks of a river and can be floated direct to the factory, and in both cases there are difficulties in securing an adequate labour force to extract the bamboo required. The India Paper Pulp Company has not yet succeeded in landing bamboo at Jaitpura at less than Rs. 33 a ton, so that there is much work to be done before costs are brought down to a reasonable level. It is certain, we think, that several years must elapse in each case before economical extraction on a large scale is possible, and for this reason it is not likely that pulp could be shipped at Rs. 220 a ton until the fourth or fifth year. On the other hand, we do not suggest that Rs. 220 a ton is the lowest price at which export can ever be profitable. As time goes on and production is cheapened, it is quite conceivable that export will be possible at Rs. 200 a ton or even less, but we are not entitled, on the evidence before us, to count on a lower figure than Rs. 220 a ton at present. The Cuttack and Chittagong projects are entirely comparable in most respects, but Cuttack has a great advantage in the proximity of the new Talcher coalfield, only 65 miles away, which reduces the cost of power and fuel by Rs. 10 or Rs. 12 per ton of pulp as compared with Chittagong. The result is that a mill at Cuttack would have a distinct advantage over a mill at Chittagong when selling in Calcutta.

93. The India Paper Pulp Company have included in their

Prices of wood pulp which would render possible the export of bamboo pulp. estimates for comparative purposes the actual costs of certain Norwegian pulp mills, and arrive at the conclusion that about £17 a ton c.i.f. Calcutta—equivalent to £15 f.o.b. Go-

thenburg—is the lowest price which gives the Norwegian manufacturer a reasonable profit. This figure of £17 is also the price at which the Titaghur Company anticipate easy-bleaching sulphite pulp will ultimately stabilise itself. Actually the price has been a good deal lower in the last eighteen months, and was quoted as £15-10-3 c.i.f. Calcutta, in August 1924, and since that date there has been a fall of about 10 shillings a ton in the prices quoted in the Trade Papers. Bamboo pulp would begin to compete with imported wood pulp at Calcutta when the prices were the same; export to the Far Eastern and Australian markets might begin to be possible when bamboo pulp could be sold, f.o.b. an Indian port, at about £1 a ton below the c.i.f. price of imported pulp, but export to Europe would not be feasible until bamboo pulp could be shipped at a price, f.o.b. an Indian port, less by £4 a ton than the c.i.f. price of imported pulp. A comparison of these prices and the assumed price of Rs. 220 a

ton at which bamboo pulp could be shipped at Calcutta or Chittagong can best be given in tabular form.

	Re.=1s. 4d.	Re.=1s. 6d.
	£ s. d.	£ s. d.
Sterling equivalent of Rs. 220 . . .	14 13 4	16 10 0
Present c.i.f. price of imported wood pulp . . . .	15 10 0	15 10 0
Price of wood pulp at which export of bamboo pulp to the Far East and Australia might begin . . . .	15 13 4	17 10 0
Price of wood pulp at which export of bamboo pulp to Europe would be possible . . . .	18 13 4	20 10 0

It will be seen that with imported pulp at £15-10-0 a ton c.i.f. Calcutta, bamboo pulp can compete in India if the exchange is below 1s. 5d. but not above that rate. With imported pulp at £17 a ton, bamboo pulp has an advantage of 10 shillings a ton even when the exchange is at 1s. 6d. A very small increase in the present price of wood pulp would bring export to Australia and the Far East into the region of practical politics with the exchange at 1s. 4d., but the price would have to be £2 higher with the exchange at 1s. 6d. Export to Europe is not possible on any hypothesis until the price of imported wood pulp approaches £19 a ton. The prospects of developing a considerable export trade will be seen to be somewhat remote, when it is remembered that years of effort will be necessary to get the cost of bamboo pulp down to Rs. 220 a ton.

94. We have now to consider the possibility of establishing a pulp manufacturing industry to supply the Indian paper mills. The imposition of a protective duty on Indian pulp presupposes an even higher duty on imported paper, for obviously the potential purchasers of pulp must be kept alive. The resulting position may be summarised in a very few words. If the duty on pulp were imposed to take effect immediately, there would be no one to sell pulp, and if its operation were postponed for two years, there would be no one to buy. The India Paper Pulp Company with their present equipment cannot even produce sufficient pulp for their own requirements, and consequently are not sellers. The Carnatic Paper Mills, Limited, may be able to produce a little over 3,000 tons of pulp a year, and as they apparently do not intend at the outset to convert their pulp into paper, they might have this quantity to sell. But the situation of the mill at Rajahmundry in the Madras Presidency, 627 miles from Calcutta, is very ill chosen if the intention is to supply pulp to the existing paper mills, and the railway freight would add heavily to the cost. It is not a business proposition that mills in Bengal should draw their pulp supplies from so distant a source, and the Carnatic Paper Mills ought in reason to convert their bamboo pulp into paper for sale in Southern India. If, on the other hand, the

Grass mills likely to manufacture their own bamboo pulp if a duty is imposed on wood pulp.

operation of the duty were postponed for two years, it is most unlikely that the Titaghur and Bengal Companies would be content to purchase the pulp they needed from other firms, when it would not be difficult to equip themselves for the manufacture of bamboo pulp. Indeed they have expressed their intention of doing so, and the two years' postponement was demanded precisely for this purpose. It would be possible for the mills to install new plant, or convert part of the existing plant at Titaghur and Raniganj, for the manufacture of bamboo pulp, but if the cost of bamboo delivered at the mill was likely to be excessive, as seems probable, a feasible alternative would be for the mills to combine to erect a bamboo pulp mill at Cuttack. Pulp could certainly be obtained more cheaply in this way than by purchase from an independent company manufacturing at Chittagong or at some point on the Arakan and Tenasserim coasts.

95. If our forecast of the result of a protective duty on Growth of a separate Pulp imported wood pulp is correct, no separate industry improbable. rate industry for the manufacture of bamboo pulp would come into existence,

and the eventual development of an export trade would not in any way be promoted. The pulp mill at Cuttack would be of the nature of a tied house, and indeed a pulp mill established at that place, under whatever auspices, would always find it more profitable to sell in India than to export. The Titaghur and Bengal mills between them could without difficulty absorb the entire output of a 10,000 ton mill, so that there would be no surplus for export. Since the Couper mill at Lucknow uses no wood pulp, the independent Pulp industry would be left to cater for the needs of the Deccan Paper Mills at Poona, which might purchase as much as 1,000 tons of pulp in a good year. To raise the cost of paper by Rs. 15 to Rs. 20 a ton, merely in order to constrain the Indian paper maker to forego the use of imported materials, would be a somewhat stringent measure, especially when the cost must be borne by the consumers of paper.

96. It is sometimes argued that paper could be produced more cheaply in India if the industry were organised on the European model, the paper manufacture not feasible at present.

Separation of pulp from paper pulp being manufactured in one set of mills erected near the raw materials, and the pulp converted into paper in other mills near the coalfields and the principal markets. It would appear, however, that there are two conditions, at least one of which must be satisfied, before an arrangement of this kind becomes feasible or practically advantageous. The first is that the demand for pulp should be sufficient to give the Pulp industry the advantage of mass production, and the second is that there should be some source of power or fuel within easy reach of the pulp factory. Both conditions are satisfied in Europe, for the Scandinavian mills export far more pulp than is consumed in the paper mills of Norway and Sweden, and they have cheap hydro-electric power and also firewood, and are not dependent on imported coal. Neither condition is yet satisfied in India. Mass

production will come in the future if bamboo eventually replaces wood as the world's principal raw material of paper. But it has not yet been shown that cheap hydro-electric power can be developed at suitable factory sites near the principal bamboo-growing tracts, and for the present most of the pulp factories would be dependent on the use of coal brought from very long distances. The principal saving which can be effected by manufacturing pulp near the raw materials is a great reduction in the cost of bamboo, not only because the transport charges are lower, but also because the special establishments employed to supervise extraction can be cut down to a minimum. On the other side there is the freight on at least a ton and a half of coal to be taken into account, additional freight on the chemicals used, some inevitable duplication of the supervising staff, and an increase in the overhead charges when two mills have to be erected instead of one. When allowance is made for all these factors, it is not clear that the separation of the manufacture of pulp from the manufacture of paper would reduce the cost of production in India at present, and a close analysis of the estimates prepared by the India Paper Pulp Company fully supports this view. The sole case yet brought to notice, which may prove to be an exception, is the scheme for a bamboo pulp mill at Cuttack, for there the proximity of the Talcher coalfield to the mill site might just turn the scale. For the rest, we do not anticipate that the construction of bamboo pulp mills will become profitable in India until the export of pulp is something more than a hope for the future.

97. It was claimed by the India Paper Pulp Company that

Possibility of replacing imports of wood pulp by bamboo pulp not yet established.

bamboo pulp was as good as wood pulp for all purposes, and that if bamboo pulp were available, the importation of wood pulp would be unnecessary. This claim is not admitted to the full extent by the grass mills.

They conceded that bamboo pulp could be substituted for a considerable proportion of the wood pulp they use at present, but they were inclined to think that some wood pulp might still be needed. Their technical advisers, they said, had not yet finally made up their minds on the question. In the hope that the point might be settled definitely, we suggested to the mills that a practical experiment might be made, and in November 1924 the Titaghur Mills made 5 tons of paper from equal quantities of their own grass pulp and of bamboo pulp supplied by the India Paper Pulp Company. Samples of this paper were tested by the Controller of Printing, Stationery and Stamps, who submitted a report on the results to the Board. In several respects the paper proved unsatisfactory, and in particular it was found to be weaker, not only than paper made principally of *sabai* grass—which was to be expected—but also than paper made entirely from bamboo. The weakness could not, therefore, be attributed to the materials, but only to the method of manufacture. The result is disappointing, but it is wholly indecisive. It does not in any way prove that

bamboo pulp cannot replace wood pulp for all purposes, but it supplies no evidence that it can. Further experiments were made early in 1925, both at Raniganj and at Naihati, but the results reached us too late for consideration before Mr. Ginwala's departure on leave at the end of February. It has not yet been established that bamboo pulp can replace the whole of the wood pulp at present used by the grass mills, and this fact weakens the case for a protective duty.

98. Our consideration of the evidence leads us to the conclusion that the proposal for a protective duty on imported paper pulp cannot be supported.

Protective duty on imported pulp not recommended. We believe that, as the world's supplies of timber diminish, a continuous increase in the cost of wood pulp is inevitable, and that bamboo is likely to become a very important material to the paper maker. But though the development of an export trade in bamboo pulp in the future is probable, the prospects of its coming about at an early date are not assured. It is not possible to forecast with any certainty the date when the price of wood pulp will advance materially, and a premature investment of capital in pulp mills might entail heavy losses to investors. The imposition of a protective duty on imported pulp might compel the Indian paper mills, which use grass as their staple material, to substitute bamboo pulp for wood pulp, though it is not yet clear that they could do so completely. But it is not likely that a separate Bamboo Pulp industry would come into existence, for the grass mills would almost certainly make their own arrangements to supply themselves. The proposed duty, therefore, would not achieve the object sought to be attained, and it cannot be recommended.

## CHAPTER V.

## Examination of the claim to Protection.

99. The primary claim made on behalf of the Indian Paper industry is that it possesses a natural advantage in the existence of an abundant supply of suitable raw materials, namely, *sabai* grass

*Sabai* grass as a paper-making material. and bamboo, and these must be considered separately. The merits of *sabai* grass as a paper-making material are unquestioned. Mr. W. Raith, for example, stated when giving evidence before the Board:—"Grass is a very superior quality of raw material. It is better than bamboo and it is as good as anything in the world. The only thing that can compare with it is Esparto used by the English paper-makers." The paper made from *sabai* grass is strong and durable, and gives good bulk for its weight. To this extent, the claim made has been fully substantiated, but there are also disadvantages. *Sabai* grass grows in forest areas in tufts intermixed with other vegetation, and it has been found exceedingly difficult to free the grass from accidental impurities such as fragments of leaves, twigs and roots before it is placed in the digesters. These impurities cause ugly specks on the surface of the paper which spoil its appearance, and the process of bleaching them out involves both an excessive consumption of bleach and an unnecessary destruction of fibre. This difficulty of obtaining clean *sabai* grass is only a minor disadvantage, which it should be possible to overcome. Much more serious is the question whether *sabai* grass is in any real sense abundant.

100. The adequacy of the supply of *sabai* grass in India to meet the needs of a growing industry had been called in question before our enquiry commenced, and in our questionnaire we drew the attention of the manufacturers to the following passage in the evidence given by Mr. R. S. Pearson, Forest Economist, Dehra Dun, before the Fiscal Commission.

"Dealing with supplies, I do not quite agree that they [i.e., the manufacturers] were correct in their statement. They have hardly got sufficient grass to work up to their full capacity. They could not increase 5,000 tons on their present output if they were asked to do so. In other words, they have not got the raw material. If they want to expand, it might be done by importing sulphide spruce or by using other new materials. Another point is that during the last ten or twelve years there has been intensive cropping, and the grass has deteriorated considerably. That is the reason they are now going all so far afield to get their supplies, the fields nearer being very much depleted. It is therefore

questionable whether the Pulp industry which has been going on for 40 or 50 years could really continue, even if the paper-making industry did not expand at all. I know that they have now to go to Hoshungabad, Central India, Sambalpore, etc., in Bihar and Orissa and the Punjab. Raw material is not easily available and they are paying Rs. 2 per maund for it landed in Calcutta.

In giving evidence before us Mr. Pearson said that he adhered to his previous statements, subject to the qualification that there was more grass in the Sewaliks than he was then aware of. But he pointed out that this area is nearly a thousand miles from the mills.

101. Mr. Carr of the Bengal Paper Mill Company, and Sir Willoughby (then Mr.) Carey of the Titaghur Paper Mills Company, both of whom appeared before us, gave evidence together on this very point before the Fiscal Commission. The relevant passage reads as follows :—

“ Q. You say that this country has a sufficient quantity of raw materials. Would that apply to your most important raw materials? A. (Mr. Carr). There are many kinds of material. Q. At the present moment, would it apply to the grass that you use, is it sufficient? A. Probably not. Q. You would have to go to other alternatives? A. Yes. Q. Possibly such as bamboos? A. Yes.”

In the written replies to our questionnaire the opinion expressed, at least in form, was somewhat different. On behalf of the Bengal Mill it was said “ The supply of grass is largely dependent upon labour and transport; eliminating these two factors, there has never been a time when ample grass has not been available for our requirements, in spite of competition from other mills. Extension of the railway system opens up vast areas, and we look upon the supply of suitable paper-making material in India as unlimited.” On behalf of the Titaghur Mills it was said :— “ It is purely a question of cost, as it means going further afield, and to-day the economic limit has been reached for costs to make paper in competition with imported papers at to-day’s prices. If the intention is to foster local manufacture of pulp, we reckon that additional considerable quantities of materials are available by going further into present fields and from other fields, which the present mills have not prospected as being outside the range of economic working.” In substance these two replies amount to this, that there is plenty of *sabai* grass to be had in India at a price. But both answers ignore the real issue whether the grass can be obtained at a price which makes it economically advantageous.

102. Our examination of the cost of production in Chapter III led us to the conclusion that *sabai* grass could not be delivered at the existing mills at a lower price than Rs. 50 a ton on the average,

Cost of *sabai* grass at the mill.

that under favourable conditions the cost was likely to be between Rs. 50 and Rs. 55 a ton, but that in bad seasons it would be higher. *Sabai* grass at these prices is not a cheap material for the paper-maker, who caters for a market which demands the cheapest paper free from mechanical pulp. It is cheaper than Esparto which costs £6-10-0 a ton landed in a British port, but it is much more expensive than wood. The India Paper Pulp Company gave the cost of wood per ton of pulp in the Norwegian mills as £6-15-0, while Mr. Raitt and Mr. Pearson give the figure of £7 a ton or a little more, which is equivalent to Rs. 105 with the exchange at 1s. 4d., and Rs. 93 at 1s. 6d. The corresponding figure for *sabai* grass at Rs. 52 a ton is Rs. 130, which makes the grass from 24 to 40 per cent. more expensive than wood, according to the rate of exchange. Paper made from grass, therefore, starts the race under an initial handicap, and a very severe one.

103. The reasons why the cost of *sabai* grass is high have already been indicated in Chapter III. Mr. Raitt summarised them in the single word "competition." The mills were scrambling for grass,

Reasons for the high cost of Sabai grass.  
which meant that there was not enough for them all; and the demand had outrun the economic radius from which *sabai* grass could be collected. The evidence we have taken affords abundant confirmation of this view. If the Indian paper maker, in order to assure himself of adequate supplies of grass, has to resort to fields from 500 miles to 900 miles distant from the factory, thereby adding Rs. 25 a ton to the cost of paper on account of railway freight,—if, again, the competition for the available supplies is so severe that he is willing to incur annual charges by way of rent and royalty, which, even when the fields are worked to capacity, increase the cost of paper by a further sum of Rs. 25 a ton, the only possible inference is that he acted as he did because he could do no better. The representatives of both the Bengal Mill and the Titaghur Mills expressed their belief that cheaper and more accessible supplies existed. Mr. Carr spoke of four or five forests, which were not being cut, within 250 miles from Calcutta, and Sir Willoughby Carey mentioned a number of areas from which grass might be obtained. Statements of this kind, however, are useless as evidence. Paper has been made from *sabai* grass in India for more than 50 years, and it must be presumed that before the mills launched out into their very expensive commitments in the north west of India, they had satisfied themselves that the quantities of grass they required could not be obtained more cheaply elsewhere. To suppose otherwise would be to accuse the mill management of lacking ordinary commercial prudence.

104. It is natural to enquire whether, since the great distances over which grass is transported are largely responsible for the high cost, many difficulties would not be removed if the paper mill were erected near the grass instead of 900 miles away. In most cases the answer is that there can be little

Possible location of paper mills near the grass fields.

or no economy if the freight on  $2\frac{1}{2}$  tons grass for 900 miles is saved at the cost of paying freight on 5 tons of coal for a distance not very much shorter. But one project has been mooted which cannot be dismissed in this way. The Punjab Paper Mills Company, which has been established to erect a 6,000 ton paper mill at a site near the head-works of the Western and Eastern Jamna canals, about 14 miles from Saharanpur, has received concessions for *sabai* grass both from the Punjab Government and from States in that neighbourhood, and believes that the 15,000 tons of grass required can be collected within a radius of 20 miles from the mill. The rent payable to the Local Government for the area leased by it has been fixed at the very low figure of Rs. 1,600 a year, which after the first two years is subject to an increase in proportion to the quantity of grass extracted, while after ten years additional sums will be payable out of profits, if these exceed 20 per cent. The States have been given fully paid-up shares in the Company in lieu of rent or royalty on the concessions granted by them. If, in fact, 15,000 tons of grass can be collected within 20 miles of the mill, the concession is a very valuable one, for the Company are relieved not only of the railway freight and the royalty which other mills have to pay, but also of the maintenance of an expensive establishment to supervise collection. Mr. Kashi Ram, the Managing Director, estimates that the grass would cost about Rs. 14 a ton at the mill. This, we think, is an ever-sanguine estimate, but it ought to be possible to keep the cost down to some figure between Rs. 20 and Rs. 25 a ton. In that case the cost of grass per ton of paper would be between Rs. 50 and Rs. 60, and a great advantage in the cost of the primary material as compared with wood could justly be claimed. In this particular case, moreover, the initial advantage is not wiped out later on by the high freight on coal, for at the site selected hydro-electric power will be available at what are considered to be cheap rates.\* Mr. Kashi Ram states in his answers to the questionnaire that a steam boiler will be required for three months in the year when the supply is short, but that it is not intended to use coal. The inference is that for nine months in the year hydro-electric power will be used for all the processes of the mill, including the raising of steam for the digesters and the drying cylinders, and that for three months firewood will be used in a steam plant to supply the deficiency in power. If that be so, the Company evidently believe that the cost of their electric power will be small, for ordinarily electricity is a very expensive method of generating heat.

105. We think the evidence justifies us in saying that, the conditions of the Indian paper market being what

Natural advantage of they are, and with pulping wood at its present India in respect of *Sabai* price, the paper mills in India which use grass a very limited one. *sabai* grass have no natural advantage in competition with imported paper, but on the contrary are at a disadvantage. India may possess an advantage, however, in so far as it may

\*The Company will draw water from the canal and erect its own plant for the development of hydro-electric power.

be possible to erect paper mills in the immediate vicinity of the raw materials, provided a site can be selected where cheap hydro-electric power is available. The extent of the advantage would depend on the terms arranged for the grass concessions and the size of the market which would be commanded. The Punjab Paper Mills Company has been exceptionally fortunate in arranging that nearly all payments by way of royalty should be a charge on profits and not on costs, but if there were more competitors in the field, the terms might be made more stringent. The Company should possess a commanding advantage in Northern India, but the heavy railway freight on paper sent to Bombay and Calcutta might leave the manufacturer in the Punjab with little or no margin in the most important markets.

106. The Titaghur Company have in contemplation a scheme for the erection of a grass pulp mill at some point

Proposed erection of a grass pulp mill near Saharanpur.

near the grass fields of their western circle in order to supply their mills on the Hooghly with pulp. The advantages claimed for this scheme are that the freight on pulp would be much less than the freight on grass, that the cost of baling would be eliminated, and that the grass fields could be worked more intensively so as to reduce to a reasonable figure the incidence of the rent per ton of grass extracted. But the estimate that was placed before us of the cost of grass pulp in such a mill had not been sufficiently considered and is without value as evidence. The success of the scheme depends entirely on whether cheap electric power is available, and on the local supplies of firewood. If the conditions are unsatisfactory in these respects, we are not satisfied that the scheme would reduce the cost of paper made at Titaghur.

107. As a paper-making material bamboo is inferior to *sabai* grass in strength and durability, but in India

Bamboo as a paper-making material.

there is only a small demand for the better qualities of paper which could be made satisfactorily from grass but not from bamboo. For the great bulk of the paper consumed in India bamboo fibre is quite good enough

—certainly as good as wood, and possibly better. That, we think, is definitely established. Apart from the quality, the comparison between the two materials is in favour of bamboo in practically every point. The yield of unbleached pulp is 43 per cent. for bamboo, according to Mr. Raith, as against 40 for *sabai* grass, and the India Paper Pulp Company obtain 42 per cent. in actual working, whereas the grass mills apparently obtain less than 40 per cent. Much larger quantities of bamboo than of grass can be obtained from a given area, for the bamboo grows in dense clumps close together occupying a whole block exclusively, while the grass grows in scattered tufts intermixed with other vegetation. As a result, fewer labourers are required to collect a ton of bamboo than a ton of grass. There is but little danger also of the bamboo, as it reaches the mill, being intermixed with those accidental impurities which sometimes deface paper made from *sabai* grass or entail expenses in their removal.

Finally, where water transport is available, bamboo has this great advantage that it can be floated down stream in rafts, whereas grass cannot. Grass cannot indeed be worked economically beyond a certain distance from the Railway, whereas distance is of little importance when transport is by water. One difficulty is common to both bamboo and grass and is probably greater in the case of bamboo. If it is to be cheap, it must be drawn from tracts where it is nearly a waste product and where there are no vested interests to resent the diversion of the bamboo supplies in a new direction. But such tracts are usually sparsely inhabited and labour difficulties are at once encountered. The experience of the India Paper Pulp Company in the Kasalong reserve shows clearly that firms which commence to exploit the bamboo areas must not expect during the first three or four years of working to obtain satisfactory results in respect of either quantity or cost. The initial difficulties, we believe, can be overcome, but every project for manufacturing pulp or paper from bamboo should be narrowly scrutinised at the outset, so that adequate measures may be taken to obtain results quickly.

108. An objection to the use of bamboo in paper mills has sometimes been advanced, namely, that all No great danger of the bamboo in a given tract might flower simultaneous flowering of simultaneously, with the result that the bamboo. supply of materials to the mill would be completely cut off for three or four years together. But the experience of the last 12 years has dispelled these apprehensions. It has been found that flowering occurs in large patches in one area, but there is no wholesale flowering over a whole district, and the process may take a number of years before it is complete. On the west coast, for example, the bamboo started flowering in 1908 or 1909, but did not begin in Malabar till 11 years later. Moreover there are generally more than one species in every forest, and the prospect of their all flowering simultaneously is very remote. The flowering of the bamboo would probably mean some increase in cost to the mill for four or five years, but there is no danger of a stoppage of supplies. As it happens, the bamboo has flowered over the greater part of India since 1900, and as the interval between flowerings is from 40 to 80 years, a mill commencing now would have little to fear.\*

109. The cost, delivered at Naihati, of bamboo from the Kasalong Cost of bamboo at the mill. reserve is still excessive (Rs. 55 a ton in 1923-24), but the bamboo obtained from other sources cost only Rs. 45 a ton. This is equivalent to Rs. 107 per ton of paper, so that, with the exchange at 1s. 4d., bamboo is almost on an equality with wood and about 15 per cent. dearer with the exchange at 1s. 6d. If 10,000 tons a year could be extracted from the Kasalong reserve, we have calculated (paragraph 59) that the cost could be brought down to

\*The substance of this paragraph and much of the wording is taken from the evidence of Mr. Pearson and Mr. Raitt.

Rs. 41 a ton, which means Rs. 100 per ton of pulp. So far bamboo has no advantage over wood, but is clearly in a better position than *sabai* grass. But to a mill erected at a point to which the bamboo could be brought direct by water transport from the forest the cost would be about half, and the cost per ton of pulp Rs. 50 approximately. Such mills would have a great advantage in the cost of primary raw materials over any European mill, but the difficulty still remains that the higher cost of coal would neutralise the initial advantage. This difficulty does not exist at Cuttack (see paragraph 92) which is within 70 miles of a coal field, but it does apply to the various schemes about to be mentioned (paragraph 111), and there is no evidence that hydro-electric power can be made available in any of them. But in one respect the circumstances of grass and bamboo are different. Only half the quantity of coal needed for the manufacture of paper is required for the production of pulp, and it is quite possible that India might begin an export trade in pulp although protection was still needed by the Paper industry. There is an exact analogy in the iron and steel trade, for protective duties were imposed on steel years after pig iron had been exported to Japan and the west coast of America. Once the export of pulp began, mass production would be possible, and it might be economical for paper mills in Calcutta to obtain the whole of their pulp from the exporting mills and confine themselves to the manufacture of paper. The high freight on coal would in this way be minimised.

110. It remains that we should consider the quantities of bamboo which are commercially available. Very *Indian supplies of bamboo.* sanguine estimates have sometimes been made of India's potential wealth of paper-making materials in the form of bamboo. Thus, for example, Mr. Raith, in a paper read to the Royal Society of Arts in 1921, remarked :—

“ It is, I think, a modest estimate to say that from bamboo, taking only that which is available under possible manufacturing conditions, Burma Bengal and South West India could produce ten million tons of pulp per annum\*.....India could therefore produce pulp for the whole world.”

We are not concerned to set limits to the possibilities of the future, but we are unable to assent to a doctrine so broadly stated. It may very well be true that India possesses enough bamboo to make ten million tons of pulp, but the commercial exploitation of Indian bamboo on anything approaching this scale is a prospect so remote that it cannot affect any decision as to the action of Government at present. We have approached the problem from a different angle and with a far more modest objective. A great deal of exploratory work has already been done in connection with this matter by Mr. Pearson and Mr. Raith, and it seemed to us

---

\*The passage omitted from the quotation is “and Assam from Savannah grasses three million.” It has been omitted in the text because it is irrelevant to the question of bamboo, but in fairness to Mr. Raith it is given here.

important to ascertain which of the sites examined offered the best prospects. If the chances of success can be determined where the conditions appear to be most favourable, and if the bamboo from the selected areas is sufficient to support a considerable industry, it is needless to enquire what further possibilities lie in the background.

111. Five sites were selected by Mr. Pearson and Mr. Raith as The five selected bamboo areas. being those where the exploitation of bamboo as a paper-making material could best be attempted in the near future. Two of these—Chittagong and Cuttack—have already been discussed in Chapters III and IV and need not again be described, and the remaining three are all situated in Burma, in three different divisions of the Province. Certain features are common to all the schemes. In each case the bamboo grows in abundance up-country at a considerable distance from the mill site, and must be floated in rafts down the rivers, and in none except Cuttack is any local source of power or fuel available. In four out of the five areas it would be necessary to establish the factory some miles up-stream from the port, owing to the fact that the rivers are tidal and the water brackish at high tide. Of the three Burma projects the most promising appears to be the scheme for the Arakan division, where the mills would be situated near Akyab.

Mr. Pearson told us:—“ I went up 120 miles from the port to see whether there was suitable rafting water, and the whole way there were dense blocks of solid bamboo on each side as far as you could see to the horizon. It was an extraordinary sight, as they were 16,000 square miles of a complete block of bamboo and no trees at all.” He added that there were magnificent streams down which to float the bamboo. In Mr. Raith’s opinion there is room in the Arakan area for several mills, and it is superior to the other areas in the fact that the supply of labour is good. Mr. Pearson says:—“ During the tour I made, I found small villages all the way scattered through these areas, with a small patch of cultivation and the inhabitants living a good deal on cutting down bamboo in the neighbourhood of their villages, burning them and then sowing their crops. The people are used to cutting bamboos, and there were plenty of them to cut and they lived on the spot. They have no call on the bamboo except that just in the vicinity of their houses, and for further supplies they have only to go a short distance further on a few yards off ”.

The second area is in the Tenasserim division, and the mill (or mills) would be situated about 10 miles above the port of Tavoy. Here also the conditions are favourable, except that coal would have to be brought by sea and labour would have to be imported. The third area is on the Pegu river, and the mill would probably be established at some distance from Rangoon. It is estimated that bamboo could be extracted in quantities sufficient for a 10,000 ton mill, and though the labour supply is not so good as in Arakan, it is believed that imported labour would not be necessary. A

concession in this area was granted to the Titaghur Paper Mills Company some years ago, but the Company eventually gave it up for reasons which have not been fully explained to us. Apparently some difficulty arose over interference with local vested interests, not so much of the cultivators as of the traders who dealt in bamboo. The Akyab and Tavoy sites are admirably adapted for mills which intended to develop an export trade in pulp, while the Pegu site would serve equally well for a paper mill to supply the local market.

The Board's conclusions  
about bamboo.

112. We think it is established:—

- (a) that the supplies of bamboo in the areas where the other conditions are favourable are very large, sufficient indeed to meet the needs of all the paper mills in India and leave a surplus from which an export trade in pulp would eventually develop, and
- (b) that bamboo can be landed in a mill accessible by water transport from the forest at a cost low enough to make it a great deal cheaper than wood is to the European pulp manufacturer.

Whatever difficulties may await the Indian Paper industry, its supply of raw materials is secure. We now turn to the auxiliary materials.

113. Most of the chemicals required for the manufacture of paper are now made in India, and only a few of them are necessarily imported. Of these the most important are sulphur (used only by the India Paper Pulp Company), dyes, and—until a year or two ago—bleaching powder. The materials invariably purchased in India are rosin, lime, magnesia, sulphuric acid\* and hydrochloric acid\*, while the list of those which are sometimes purchased in India and sometimes imported includes china clay, caustic soda, alkali, alum and alumino-ferric and common salt\*. It might seem that in this matter the Indian mills were reasonably well off, but in fact they labour under a serious disadvantage as compared with their European competitors. In some cases the material has to be brought from sources several hundred miles away and the transport charges are heavy. Lime, for example, has to be brought either from Katni or Sylhet, and magnesia from Madras, while, owing to the rail freight, imported salt is cheaper than Indian salt in Calcutta. Again, the quality of the Indian china clay is open to question and at least two of the mills, after trial, have found it to be unsatisfactory. The price of most of the other chemicals purchased in India is regulated by the cost of importation of materials, and though there are advantages in local purchase, there is but little saving in cost. The prices paid by an Indian mill for chemicals usually exceed the prices paid by

---

\*These materials are used by the Titaghur Company for the electrolytic manufacture of bleach.

European mills by the full amount of the sea freight and landing charges, and in most cases\* of the Customs duty as well, but to estimate the extent of the disadvantage per ton of paper is not easy. The India Paper Pulp Company have given the cost of auxiliary materials per ton of paper in a British Esparto mill as £3-9-6, which is equivalent to Rs. 52 at 1s. 4d. and Rs. 46 at 1s. 6d. The lowest figure yet attained in any Indian mill is Rs. 73 at Titaghur in the first six months of 1924-25, and the difference between this sum and the British cost is not greater than was to be expected in the circumstances. But the expenditure of both the other mills on chemicals is much higher, and there is reason to believe that in a European mill manufacturing paper from wood the cost would be much lower than in an Esparto mill. For a Norwegian pulp mill the India Paper Pulp Company gave the cost of chemicals per ton as only £0-11-6, *i.e.*, about Rs. 8, as against their own estimated cost of Rs. 49 per ton of pulp. On the assumption that the cost of chemicals after the pulp stage is much the same whatever material is used, the cost of chemicals in a mill making paper from wood would not much exceed Rs. 30 per ton of paper. In that case the disadvantage of Indian mills must be great indeed, and it becomes important to ascertain whether the cost could not be brought down substantially.

114. It is clearly impossible for us to examine in detail the technical issues involved, but there are several points which call for notice. In the first place, the efficiency of the soda recovery plants at Titaghur and Raniganj seems poor, for the percentage of soda recovered is about 50 per cent. as against 80 per cent. or more in European mills. In the second place, the experience of the Titaghur Mills has shown clearly that a real economy can be made by introducing the electrolytic manufacture of bleach and caustic soda. Unfortunately there are difficulties, apparently insuperable, in the way of making bleaching powder in India, and the bleaching liquor such as is made at Titaghur would not stand the cost of transport, so that each mill must install its own plant and this means heavy capital expenditure. Nevertheless, we believe that in time most of the mills will find it pays them to adopt the process. More important than either of the points just mentioned is another improvement suggested by Mr. Raith.

115. Mr. Raith has worked for a number of years on the application of the soda process to the production of fractional digestion. bamboo pulp, and the name he has given to the modification of the process to which his investigations led him is 'fractional digestion'. Pulp produced from bamboo by the ordinary process is dark in colour, and consequently needs a great deal of bleaching, which leads to loss of fibre. The various substances which have to be removed in the process of digestion fall into several groups, and it was found that the bleaching difficulty was

\*Sulphur is admitted free of duty, and the Titaghur Mills pay no duty on the salt used in the manufacture of bleach.

entirely due to two groups while the others were innocuous. In the ordinary process all the groups are removed simultaneously by boiling the material at high pressure, and under these conditions the dangerous constituents are re-absorbed by the pulp and discolour it. As it happens they are more easily soluble than the innocuous groups and can be extracted by boiling at a lower pressure. In the process of fractional digestion the constituents likely to discolour the pulp are first removed at low pressure, and the other groups, which can do no harm, are then extracted at high pressure. If the soda process was to be applied to bamboo at all, some modification of this kind was necessary, but it can also be applied with advantage to *sabai* grass, which contains the same constituents which tend to discolour the bamboo pulp, though in a lower proportion.

116. Several advantages are claimed for the process of fractional digestion, and the most important is that in a grass mill the quantity of bleach required is reduced by one-half. In addition the colour of the pulp as it leaves the digesters is so much improved that no bleach at all is required for such papers as "badami," and the saving here is not only the cost of bleach but also the avoidance of the 7 per cent. waste of fibre which normally takes place at the bleaching stage. The minor advantages are that the consumption of caustic soda is reduced by nearly a fifth, and also, since the digestion is carried out at a lower temperature, there is less destruction of fibre at the pulp stage, the difference on the yield, according to Mr. Raith, being about 2 per cent. The advantages claimed for the process as applied to grass appear to have been fully established by the work already done in the experimental plants at Dehra Dun. Of the work done on bamboo during the last nine months we have received only a very brief report, which does not make it possible to arrive at a final verdict, but all the circumstances suggest that it is likely to be a favourable one. Mr. Raith's discovery is of first class importance to the Paper industry, and in particular should do much to reduce the very high cost of chemicals per ton of paper in the Indian mills.

117. Fractional digestion is a modification of the soda process and cannot be used in the sulphite process, so that the India Paper Pulp Company can derive no advantage from Mr. Raith's discovery, but they are equally concerned with the grass mills in securing a reduction in the cost of chemicals. If the actual cost of chemicals per ton of pulp in a Norwegian mill is only one-sixth of the cost in a bamboo mill, the difference in the price of materials, as between India and Europe, will account for only a small part of the discrepancy. The explanation which naturally suggests itself is that the wide divergence in costs is due to a difference between wood and bamboo, which involves another and more expensive treatment such as the use of more chemicals or a longer period of digestion. The only difference which has been brought to our notice is the fact that wood contains only a trifling proportion

of the unbleachable constituents which are found in bamboo, and it may be that the India Paper Pulp Company have not yet been completely successful in dealing with the problem which Mr. Raitt set himself to solve on other lines. So far as the quality of the paper produced is concerned, the application of the sulphite process to bamboo has passed beyond the experimental stage, but there is much work still to be done before a similar verdict can be pronounced as to the cost at which the results are achieved, and particularly as regards the cost of chemicals. In their forecast of future expenditure the Company have wisely refrained from counting on any saving which is not yet in sight, and their estimates are all the more valuable for that reason. But unless the cost of chemicals per ton of pulp can be substantially reduced, it certainly seems that in this respect the soda process is likely to be the cheaper.

118. A good deal has already been said about power and fuel, and no lengthy discussion is necessary at this

**Power and Fuel.**

stage. India has natural advantages in respect of materials such as *sabai* grass and bamboo, and also has supplies of cheap coal, but it is rarely possible to select a site where both advantages are combined, Cuttack and Saharanpur being the only exceptions yet brought to notice. Usually a choice has to be made, and the mill which gets its grass and bamboo cheap will find its coal very dear. This is not a difficulty peculiar to the Paper industry. The concentration of all the best coal deposits in India in one locality is an obstacle which retards the development of India's material resources in the less favoured regions. The importance of low freights on coal to the Paper industry is obscured at present because the principal mills have preferred to be near their markets and their coal, even though they have to go far afield for their raw materials. But this concentration of the industry in one area has its disadvantages, for the Calcutta mills cannot expect to command the market in all parts of India in the face of the heavy Railway freight on paper. Low transport rates on coal by rail and steamer are indispensable if full use is to be made of India's valuable paper-making materials. But when all that is possible has been done in that direction, the difficulty will not be completely removed. It is evident that every project for the manufacture in India of paper or paper pulp demands the closest scrutiny in order to determine whether local sources of hydro-electric power cannot be utilised, and the possibility of reducing the coal consumption to a minimum by using wood fuel is almost equally important. In addition, the machinery and plant in the mills should be so designed as to secure the highest steam efficiency attainable. The industry will have no chance against foreign competition unless every step possible is taken to minimise the disadvantage which results from the long distances which divide the coal and the raw materials.

119. Like most other industrial establishments at the present stage of India's industrial development, the paper mills have found it necessary to employ a certain number of Europeans to fill the

**Labour—European staff of the paper mills.**

higher supervising appointments, and since the European must necessarily be paid a higher salary than he would accept for doing similar work in his own country, the cost of the supervisory staff is higher than in Europe. It is when an industry first starts that the disadvantage is most severely felt, and as time goes on it should gradually diminish and eventually disappear. Paper-making by modern methods has been carried on in India for half a century, and by this time it might be expected that considerable progress would have been made in replacing Europeans by Indians. It is disappointing, therefore, to find that few, if any, Indians have yet risen above the foreman class. In two up-country mills, it is true, something has been done. The Manager of the Upper India Couper Paper Mills is an Indian who entered the works as an apprentice on Rs. 16 a month, and only three Europeans are employed in the mill as paper makers or machinemen. The Deccan Paper Mills Company informed us that their Indian labour had been so thoroughly trained that no European labourers or supervisors were now required. Both these mills are small, however, and neither has been particularly successful. The Lucknow mill is working only one of its two machines, and the Poona mill was shut down at the time we visited it. It is the progress of Indianisation in the larger mills that is important, and the results in them are not satisfactory. Twelve Europeans are employed at Raniganj, including the Manager and Assistant Manager, four engineers, a chemist, a foreman, two machinemen and two paper makers. During the last twenty years six additional Europeans have been employed as new machines were added to the plant, and there has been no displacement of Europeans by Indians. In 1923 the pay of the European staff amounted to Rs. 29 per ton of paper produced, and if they could have been replaced by Indians the cost would have been lower by at least Rs. 12, which is not a negligible amount. In the two Titaghur mills 16 Europeans are employed—a reduction of 6 or 7 since 1914. Only four Indians, however, draw pay of Rs. 250 a month or more and hold posts formerly held by Europeans. The position at Naihati is more satisfactory, for the mill has been operating for little more than two years, using a new material and working a new process, and there has been no opportunity as yet to train Indians for responsible duties. Nevertheless, the chemist is an Indian and the European staff is limited to a Manager, an engineer and two machinemen. When a second machine is added, an assistant engineer and a third machineman would be required.

120. The explanation given by the representatives of the

Explanation given by the mills of slow progress in Indianisation.

Titaghur and Bengal Companies of the small progress made towards Indianisation was that, while Indian labour had been found quite satisfactory in subordinate skilled positions, Indians had not hitherto proved capable of supervisory appointments. Indians of the right stamp had not come forward to qualify themselves for the higher technical work, and those who presented themselves had failed to carry on their training, and had generally left the mill after acquiring only a superficial knowledge.

Indians, it was suggested, found the conditions of work in a paper mill too arduous and exacting, and also were unwilling to begin their apprenticeship at the age of 15 or 16. Great stress was laid on the necessity of beginning to learn the trade early in life, and the opinion was expressed that it was too late to begin at the age of 22 to 24 on the completion of a college training.

121. We should be sorry if we were compelled to assent to these Necessity for training arguments, which go far to destroy the case Indians in paper manufac- for protection. An industry in which ture. Indians could never expect to fill the higher appointments would have scant claim to assistance from the State. We recognise that in the past the number of Indians anxious for an industrial career has not been large, and that the age of entry creates a real difficulty. But in recent years there has been a marked change in the attitude of Indians to industrial work, and a much greater readiness to face the inconvenience and discomfort which it may entail. We have heard of several young men who have studied paper-making in Europe or America, and one of them, Mr. Bhargava, gave evidence when we visited Dehra Dun. It may be true that the Indian apprentices employed at Raniganj and Titaghur failed to make good because they were not of the right stamp, but we are not satisfied that any particular effort was made to get hold of the right kind of men. As to the age of entry, it may be very desirable that apprentices in paper mills should begin to learn their trade as boys, but it is not so clear that it is essential. What is required, we think, is that a concerted scheme for training Indians should be drawn up, and that the mills should combine with this object. The co-operation of the Local Governments would, of course, be indispensable, and would no doubt readily be given. In particular, it seems probable that much of the training should preferably be given in Europe and America, and a system of State technical scholarships would be the natural way of providing for this. We find no reason for thinking that Indians cannot be trained to fill in time any appointment in a paper mill, but an organised scheme of training is necessary. The conditions in the Paper industry are certainly no more arduous and exacting than they are in the Iron and Steel trade, for which Indians are now readily coming forward.

122. It might appear that, owing to the slow progress made in Indianisation, the cost of labour in the Indian paper mills relatively cheap. Labour in Indian paper mills would be higher than in Europe, but this is not so. The cost of labour per ton of paper in a British Esparto mill is given by the India Paper Pulp Company as £4-18-0, which is equivalent to Rs. 65 with the exchange at 1s. 6d. and Rs. 73 with the exchange at 1s. 4d. As against this, the labour costs at Naihati have been as low as Rs. 61 per ton of paper, and the grass mills should be able to bring down the cost of labour to about the same figure when they are manufacturing to capacity. It is true, of course, as we have pointed out before, that the paper which competes with Indian paper is not made from Esparto but from wood, and we have no evidence as to

the cost of labour per ton of paper in mills which use wood pulp. But the cost of labour per ton of pulp in Norwegian mills, as given by the India Paper Pulp Company, is £2, which is equivalent to Rs. 27 with the exchange at 1s. 6d. and Rs. 30 with the exchange at 1s. 4d. The Company estimate that their own labour costs at the pulp mill will not be more than Rs. 16 per ton, and although this figure may be over-sanguine, we believe that it should be possible to bring down the costs of labour to about Rs. 20 per ton of pulp. The inference is that in a mill using nothing but wood, the labour costs would not be much less than in a mill using Esparto. If that be so, India is at no disadvantage as regards the cost of labour, but has already some advantage, though not a large one. The explanation no doubt is that the lower wages paid in Indian mills more than counterbalance the smaller effectiveness of the individual workman. The question of Indianisation is, nevertheless, of importance on the financial side, for the disadvantages of the Paper industry in India are so serious that every potential advantage must be utilised to the full.

123. The question of the market for the Indian paper has been fully discussed in Chapter II, and a brief *Market for paper in India.* summary will suffice here. The market open

to the Indian paper maker at the present rate of consumption we have estimated to be about 50,000 tons, of which something less than 30,000 tons is already supplied by Indian paper. The surplus capacity of the Indian mills would provide for about one-fourth of the balance, and when the mill partially erected at Rajahmundry, and the mill projected near Saharanpur, are completed, the Indian mills would be supplying more than four-fifths of the whole demand. It follows that while the market for paper in India is sufficient to support a considerable industry, it is not large enough to admit of any great development. For the finer and more expensive kinds of paper the Indian demand is small, and until it has increased very substantially no Indian mill can compete with the European mills which specialise in the finer qualities of paper.

124. It remains to mention one more disadvantage under which *High initial cost of paper mills in India.* the Indian industry suffers, namely, the heavy initial expenditure involved in the erection of a paper mill. It was ascertained in paragraph 81 that the capital cost of a paper mill erected since the war could not be taken as less than Rs. 800 per ton of output. What the corresponding figure would be for a new mill erected in Europe it is difficult to say. In the estimate made for the Titaghur Company, about half the cost of the mill as finally erected in India represented the cost of machinery and plant f.o.b. at a British port. If so, the total cost of a new mill erected in Europe would not be more than three-quarters, and might be as low as two-thirds, of the corresponding cost in India. The point is not of very great importance, however, because the competition the Indian mills have to fear will come not from new European mills, of which there are likely to be few while the trade depression lasts, but from the older

mills which utilised their war profits in writing down their block and bringing their equipment thoroughly up-to-date. The European mill, therefore, has two great advantages. The sum required per ton of paper in order to yield a reasonable return on the capital investment is very much smaller—perhaps not more than a third of the sum required by a new mill in India—and the allowance for depreciation is less. The second disadvantage will tend to grow smaller as time goes on, for the depreciation allowance is ultimately regulated by replacement costs, but the first disadvantage is permanent. It is true that the Raniganj and Titaghur mills also enjoyed high war profits, and have been able to write down their block accounts heavily and also to do something towards bringing their equipment up to date. But their period of prosperity was a short one and followed a long series of years when they barely held their own. The sums set aside from war profits have not been sufficient to do more than a part of what was necessary in the way of renovation, and even if dividends had been rigidly restricted during the war and every penny that was saved had been spent on renewing the plant, much would still remain to be done.

125. The general effect of what has been said in this Chapter as

*Advantages and disadvantages of the Indian Paper industry.* regards the advantages and disadvantages of the Indian Paper Industry may be briefly summarised. The grass mills in Bengal have

the advantages of cheap labour and coal, and a large market close at hand, but they do not derive from them all the benefit that they might, for their coal consumption is too high and the European staff excessive. Their disadvantages are that their grass and chemicals are very expensive as compared with the cost of wood and chemicals in Europe. They have another advantage in a low block account, which reduces their overhead charges and the return required on capital, but the renovation of their plant and machinery out of war profits is only partial, and their works costs\* are certainly increased by an equipment which is not up-to-date. The position of the only mill in India which manufactures paper from bamboo differs from that of the grass mills in several respects. Bamboo delivered at the mill is cheaper than grass, and its costs can be brought down to a level at which it would be as cheap as wood is in a European mill. It has the advantage of an up-to-date equipment, but is handicapped by the heavy cost of construction at post-war prices. By erecting the paper mills in the vicinity of the raw materials, whether grass or bamboo, their cost at the mill can be brought down to a point which gives India a great advantage over European mills, but in most cases only at the cost of sacrificing the advantage of cheap coal, and incurring the disadvantage of remoteness from the principal markets. It has not been shown that such mills could under-sell the mills near Calcutta or in the coal fields unless they have the benefit of a local supply of power. Only two exceptional cases have come to notice, namely Cuttack, where

\*See Appendix VI.

a new coalfield is being opened at a distance of 65 miles, and Saharanpur where hydro-electric power can be developed. Bamboo, however, has an advantage over grass, which is inconsiderable at the moment, but becomes important as the cost of wood pulp rises. An export trade could then be developed, and the mass production of pulp in mills on the seaboard might bring down costs substantially. All these points are of importance in considering whether the Indian Paper industry merits assistance from the State.

126. According to the Fiscal Commission the protection of an industry would not ordinarily be justifiable unless it could be shown that without protection it was not likely to develop at all, or not so rapidly as the national interests required. We have to consider, therefore, what the result is likely to be if the existing duties are left unchanged. It is clear, we think, that the grass mills in Bengal and the United Provinces could not continue production and would have to close down. The average prices they might expect to realise in the face of foreign competition with the present rate of duty were estimated in Chapter II to be Rs. 502\* a ton for the Titaghur Company and Rs. 478 for the Bengal Company. The Couper Mill at Lucknow could not expect to realise more than the latter figure, for 50 per cent. of its output consists of Browns and "Badami". The Titaghur Company has been unable since the war to bring the works costs below Rs. 490 a ton, and the costs of the other two mills are higher. One mill, therefore, just covers its works costs and the others fail to do so. It does not seem likely that the mills will persevere much longer in an apparently hopeless struggle. It is true that, if the mills were manufacturing to capacity, the works costs could be brought down to about Rs. 460 a ton, but they cannot sell their output without lowering their prices, so that the margin between costs and selling price would be practically unchanged. It is possible that the disappearance of one of the 4-machine mills might ease the position of the others, both because there would be less competition for *sabai* grass and because the survivors might be able to sell their output without dropping prices. But both the Titaghur and the Bengal Companies have expensive commitments in their grass leases and could not benefit much for some time from a falling off in the demand for *sabai* grass. The only chance of a new development is that the Punjab Paper Mills Company might be able to raise capital for the erection of a mill near Saharanpur, where the conditions are more favourable for the manufacture of paper out of *sabai* grass than anywhere else in India. A mill erected there might be able to hold its own in Upper India even without protection, but at a time when the older mills were being forced to shut down, to raise fresh capital for any paper enterprise would be far from easy. In brief, the probability is that the manufacture of paper out of *sabai* grass would come to an end.

---

\* These prices are net at the mill. Rs. 502 a ton equals 3 annas 7 pies a lb., and Rs. 478 a ton equals 3 annas 5 pies a lb.

127. The position of the India Paper Pulp Company would be

manufacture of paper from bamboo not likely to continue without protection. The works costs have been brought down to Rs. 442 a ton, and the average price likely to be realised is Rs. 513 nett at the mill (= 3 annas 8 pies a lb.). The Company would, therefore, have a surplus of Rs. 70 a ton after meeting the works costs. But the sum required to cover the overhead charges is Rs. 85 a ton after the second machine has been added, and so long as the output of the mill is limited to 2,500 tons they must be higher. The Company, therefore, would be manufacturing at an actual loss, and the only chance of making profits would be by the addition of a second paper machine. That would involve fresh capital expenditure of about Rs. 10 lakhs, a sum which certainly could not be raised in the open market, and it is doubtful whether the firms who stand behind the Company would be ready to increase their commitments. They would naturally be reluctant to abandon an enterprise on which more than Rs. 45 lakhs have already been spent, but if they decided to go on, they would have three or four very difficult years to pass through. It is far from improbable that the mill might be closed down. The only other bamboo mill in existence is the new mill (still incomplete) of the Carnatic Paper Mills, Limited, at Rajahmundry. With the aid of a loan from the Madras Government the Company have apparently succeeded in raising all the capital needed for the manufacture of paper out of straw, but as far as bamboo is concerned they are at present equipped for the manufacture only of pulp, and they would have to raise fresh capital before they could make bamboo paper. It is difficult to see how this could be done, and it would be quite useless to attempt the manufacture of pulp if the paper mills in Bengal shut down. Our belief is that, unless protection is given, the manufacture of paper in India will cease, but there is a bare possibility that it would be carried on by two mills, one at Naihati using bamboo and one at Saharanpur using *sabai* grass.

128. The third condition laid down by the Fiscal Commission

Fiscal Commission's third condition as applied to the grass mills.

was that the industry should be able eventually to dispense with protection and face world competition unaided. We estimated that a grass mill near Calcutta or in the coal-fields might be able to bring down its works costs to some figure below Rs. 420, but not below Rs. 400 a ton. In that case a mill erected after the war could not earn a fair return on its capital unless it could realise Rs. 550 a ton on the average. The existing mills might be able to sell at Rs. 520 a ton, for they would have a much smaller capital account, but they would have to make a full allowance for depreciation if they wished to bring their machinery and plant up-to-date and keep it so. But if the present Customs duties were removed, the Indian mills would not be able to realise more than Rs. 420 a ton on the average, and a 25 per cent. increase in the price of imported paper would be necessary before the position of

the Indian mills was sound. To bring this about a 100 per cent. increase in the cost of wood for pulping would be required, and no rise of this order can be foreseen. The condition is clearly not satisfied in the case of the existing grass mills. But a mill erected near Saharanpur would have an advantage of Rs. 75 a ton in the cost of grass, and, provided its hydro-electric power costs no more than steam power does at Calcutta, it would have a very fair chance of survival. The evidence leads us to think that the manufacture of paper out of *sabai* grass would not be possible in any other region in India under a system of absolute free trade.

129. The position as regards bamboo cannot be so simply stated,

Difficulty of estimating the prospects of bamboo paper. for the possibilities are at once much greater and more difficult to determine. As a paper-

making material bamboo has an advantage over *sabai* grass, because the supplies are far more abundant and much more widely distributed. Only a proportion, and a steadily diminishing proportion, of India's requirements can be met by paper made from *sabai* grass, but there is enough bamboo not only to supply the needs of India, but also to develop a considerable export trade. The manufacture of paper from *sabai* grass has been carried on in India for half a century, the process of manufacture is well understood, and the possible reduction in manufacturing costs can be estimated with some approach to accuracy, whereas bamboo is a new material, and of the two processes of manufacture one (the sulphite process) has been worked at Naihati for less than three years and the other (the soda process with fractional digestion) has not been worked on a commercial scale at all. It is not yet possible to say to what extent the cost of production can be brought down or which process is the more economical, and it is therefore difficult to calculate whether the industry will eventually be able to dispense with protection.

130. We have estimated in Chapter III that, if a second paper

Probability that bamboo paper could eventually dispense with protection. machine were added to the Naihati mill, so as to raise the output to 5,000 tons a year or more, the works costs could be brought down

to about Rs. 360 a ton. If, in fact, this were done, the industry would receive all the protection it needed from the existing duties, for the mill could meet all overhead charges and earn 8 per cent. on a fair capitalisation if the average selling price were Rs. 510 a ton, which is very nearly the price which we believe they can realise to-day. If the price of imported paper were to increase by 10 per cent.—and this might come about in a few year's time with the dwindling of the world's timber supplies—a protective duty of about 8 per cent. would suffice, but an increase of about 20 per cent. in the price of imported paper would be necessary before protection became superfluous. For supplying the needs of the Indian market mills at Chittagong, Akyab and possibly Tavoy would be as well situated as a mill near Calcutta, and a mill at Cuttack might have an advantage over all of them, owing to the existence of a local supply of coal. What still remains to be proved

is whether the works cost could be brought down to, say, Rs. 320 a ton, for in that case a ten per cent. increase in the sterling price of imported paper, or a relapse of the rupee sterling exchange to 1s. 4d., would very nearly remove the need for any special assistance. We are not justified, on the evidence, in saying that a reduction in costs to this extent is possible, but it is very far from being improbable, and the direction in which economies must be sought is obvious. A reduction of between Rs. 30 and Rs. 40 in the cost of chemicals per ton of paper might come about either from improvements in the sulphite process or from Mr. Raith's method of fractional digestion in the soda process. But much work remains to be done before the point can be finally determined.

131. Our view regarding the third condition is this. The paper industry, in so far as it is dependent on the use of *sabai* grass, will never be able to dispense with protection, save in one locality in India where the conditions are exceptionally favourable. But if the abundant supplies of bamboo are developed, there is a reasonable assurance that before long no protection, beyond what the present duties give, would be needed, and grounds for hoping that in course of time, as the cost of wood pulp increases, the industry could dispense with protection altogether.

## CHAPTER VI.

### The Board's Conclusions and Recommendations.

132. The conclusions to which our survey  
Summary of the Board's conclusions. of the evidence has led us may be summarised as follows:—

- (1) The existing paper mills which use *sabai* grass do not satisfy the conditions laid down by the Fiscal Commission, and their needs are therefore irrelevant in considering the claim to protection. There is, however, one locality in the north of India where the conditions are unusually favourable for the manufacture of paper from *sabai* grass for sale in the markets of Upper India, and a moderate amount of protection at the outset might facilitate the establishment of the industry there. Subject to this exception the claim to protection depends entirely on the possibility of manufacturing paper from bamboo.
- (2) It has been proved that paper of excellent quality can be made from bamboo, and there is good ground for hoping that a Paper industry using bamboo could ultimately dispense with protection. But the manufacture of paper from bamboo is still at the experimental stage in the sense that there is much work to be done before the possible reduction in manufacturing costs can be ascertained, and before it can be determined whether the sulphite process or the soda process is likely to be the cheaper.
- (3) The world's supplies of coniferous woods are steadily diminishing, while the demand for such woods, whether as timber or for pulping, is increasing. As a paper-making material wood must become more and more expensive, and an increase in the price of paper seems inevitable. But it is impossible to forecast the date when the price of imported paper will go up substantially, and it may not take place for several years to come.
- (4) It is very desirable that the work already done on bamboo should not be wasted, and that further exploratory work should be encouraged. The principal points are—
  - (a) The manufacture of paper from bamboo by the sulphite process should be continued on a scale sufficient to ascertain its possibilities.

- (b) The manufacture of paper or pulp from bamboo by the soda process with fractional digestion should be fully tested on a commercial scale.
- (5) The matters on which further information is wanted are :—
  - (a) The cost at which bamboo can be delivered at the mill.
  - (b) The extent to which the coal consumption can be reduced by using only the best coal.
  - (c) The extent to which the cost of chemicals per ton of pulp and paper can be reduced either in the sulphite process or in the soda process with fractional digestion.
- (6) The investigation of the points enumerated in clauses (4) and (5) cannot be carried out unless a limited amount of fresh capital can be raised by the firms already in the field. It is in this direction that State assistance can most usefully be given. But it is not desirable that measures should be taken which would encourage indiscriminate investment in new projects for paper manufacture. A premature development might result in heavy loss to investors, or an onerous burden on the tax-payer and the consumer of paper for a number of years to come.
- (7) It is not advisable that Government should commit itself finally to protection for the Paper industry at present. Whatever assistance it may be decided to give should be for a limited period only, and it should be made clear that Government will not consider itself bound to continue assistance in any form after the period expires.
- (8) The manufacture of pulp and paper from bamboo might in time become a very important industry in India, and the prospects are good enough to justify the grant of State assistance to the firms who are endeavouring to promote its development. But the measures taken should be such as are likely to involve the least cost to the tax-payer, and impose the smallest burden on the consumer of paper, in so far as that may be compatible with securing the objects in view.

We have endeavoured to frame our recommendations in accordance with the principles outlined above.

133. It will be seen that we contemplate the grant of State assistance for a limited period in order that the possibilities of the manufacture of paper from bamboo may be fully explored. At the end of the period, Government would decide in the light of the information obtained, whether the industry should be protected and, if so, to what extent and by what means. We do not think

that it would be worth while to fix a shorter period than five years for this preliminary period of research and investigation. The application of the soda process to bamboo, and the reduction of the cost of chemicals in the sulphite process may entail several years of work, and the extraction of bamboo on an adequate scale from the Kasalong reserve can only be the work of time. Nor can the investigations be carried out adequately in any existing mill until fresh capital has been raised and new plant installed. Neither the coal consumption nor the cost of production can be properly ascertained at Naihati until a second paper machine has been added, the Titaghur and Raniganj mills could not use bamboo effectively without substantial modifications in their equipment and the Rajahmundry mill is equipped for the manufacture of bamboo pulp only and not of bamboo paper. The installation of new machinery is apt to be a lengthy business, and a year or eighteen months might pass before it was brought into production. Thereafter a further period of two years would be necessary before the full effect in the sulphite process of a larger scale of operation became visible, and, since the soda process has not yet been applied to bamboo on a commercial scale, decisive results could not be expected for at least that time. For these reasons we consider that the preliminary period should be fixed at five years. By the end of that time it should be possible to ascertain with reasonable certainty what the cost of making paper from bamboo is likely to be, and, in addition, it should be much easier to forecast the effect of the diminution of timber supplies on world prices of paper.

134. We have laid stress on the fact that fresh capital must be secured by the industry if the possibilities of raising fresh capital in the open market of bamboo are to be fully investigated. But the question at once arises whether, if the assistance given by Government is limited to a period of five years with no guarantee of its continuance thereafter, there is any chance that capital could be raised in the open market. It seems to us extremely improbable that it could. Whether protection were given in the form of Customs duties or of bounties, the danger that they might be withdrawn at the end of five years would be sufficient to deter the investor from incurring a very serious risk. Moreover, if the duties or bounties were pitched high enough to attract capital to the mills already in existence, they would serve equally to promote investment in new enterprises. If it did so, the position of Government when the five years expired would be exceedingly difficult, and whatever declarations might have been made at the outset, in fact its hands would be tied. It would be committed to protection by the consequences of the measures taken, although no deliberate decision had been arrived at. For these reasons we consider that the assistance needed should be given primarily by means of the advance or guarantee of capital to the firms best equipped to carry out the work which has to be done, and that the protection given in the form of Customs duties or of subsidies should be limited to the amount which is necessary to maintain in existence

a mill which is already adequately equipped for the manufacture of paper from bamboo. To fix the scale of duties or subsidies at a point high enough to attract capital to the industry would be very expensive and would lead straight to the indiscriminate investment which we deprecate.

135. So far as the sulphite process is concerned, it is obvious that the fuller investigations, which we consider necessary, can best be done in the Naihati mill of the India Paper Pulp Company. That Company has been working the process for nearly three years and has acquired experience which no other firm can possess; it has retained the services as consultant of Mr. Jardine, the inventor of the process as applied to bamboo, and it has behind it the firms who hold the patent rights over the process. The construction of a new mill with an output of 5,000 tons of paper would cost about Rs. 40 lakhs, whereas the output of the Naihati mill could be raised to 5,000 tons by an outlay, as the Company estimate, of about Rs. 10 lakhs on the purchase and installation of a second paper machine, and of additional plant for pulp production. It is clear that full information as to the possibilities of the sulphite process can be obtained at a much lower cost in Naihati than anywhere else. Our proposal is that the extra capital, which the Company require in order to achieve economical production, should be provided either by a direct loan from Government, or by a Government guarantee, both as to principal and interest, of a public issue of debentures. Both plans are equally feasible, but of the two alternatives we prefer the second, for if a guarantee were given, it might be possible to arrange that the debenture holders should have the option at the end of five years of exchanging their debentures, or part of them, for ordinary shares in the Company, and in this way Indian capital would acquire a direct interest in the undertaking. At present the India Paper Pulp Company is a private limited Company, but it has always been the intention of the promoters to convert it into a public Company with rupee capital as soon as they were satisfied that final success was assured. The participation of Indian capital in the enterprise has been contemplated from the start, and when Government come to the rescue of a private Company, it is a reasonable stipulation that those who subscribe capital on the strength of the Government guarantee should have a share in the profits, if the manufacture of paper from bamboo eventually fulfils the expectations of its promoters.

136. It is impossible at this stage to elaborate a scheme, and only a few important points can be mentioned. The total amount advanced or guaranteed might, we think, be limited to Rs. 10 lakhs, and, if the actual cost of the new plant exceeded this sum, the promoters of the Company should be responsible for the balance. With a Government guarantee it should be possible to

raise the capital in the open market at 6 per cent., and the same rate of interest might be fixed if it is decided that Government should advance the money direct. In either case we recommend that for the first two years the payment of interest by the Company should be waived, which would mean, under the guarantee system, that Government would pay the interest to the debenture holders. The new capital is not likely to be productive until the third year and it is undesirable to impose any fresh charge on the Company's resources, until that comes about. For the rest, Government (or the debenture holders) would in the ordinary course obtain a lien on the whole of the Company's fixed assets, and before the loan or the guarantee was given, an enquiry would no doubt be made as to the value of the assets to be pledged. No special enquiry as to the efficiency of the Company's management is in our opinion necessary. Their affairs are administered by a very well-known Calcutta firm, they can readily obtain through the firm of Thomas Nelson and Son such technical advice from Europe as they may require, and the manner in which their evidence in our enquiry was prepared speaks well for the thoroughness and competence of those responsible.

137. It is quite as important in the interests of the industry that the soda process (with fractional digestion) in its application to bamboo should be fully tested on a commercial scale as that further work should be done on the sulphite process, but unfortunately it is not possible to make equally definite recommendations. The Carnatic Paper Mills, Limited, propose to make bamboo pulp (and eventually paper) by the soda process in their new mill at Rajahmundry and their estimated annual output is about 3,000 tons of bamboo pulp in addition to about 1,500 tons of paper made from straw. The whole of the capital required to complete the mill was not forthcoming in the open market, but ultimately the intervention of the Government of Madras removed this difficulty. In January 1925 the Company wrote—

“It must certainly be of interest to the Tariff Board to learn that this Company is assured of substantial financial help from the Government of Madras in the form of a loan of rupees six lakhs. This will enable us to complete and start up our mill very shortly. Also we anticipate that the attitude of the Government indicates that our application for concessions of bamboo will be granted, and that further calls on the investing public to provide for an extension of our paper-making plant will be readily responded to.”

It appears from the Company's answers to our questionnaire that only one paper machine has been purchased and that their primary object is to make paper from straw and pulp from bamboo, and we infer that the loan to be given by the Madras Government will suffice only for this part of their programme and not for the

manufacture of bamboo paper. If that be so, the soda process could be tested at Rajahmundry, for the conversion of the pulp into paper is carried out by identical methods, whatever the process by which the pulp has been made. But there is one indispensable condition to be satisfied, namely, that the Company should be able to sell their bamboo pulp when they have made it. With imported pulp at its present price and the exchange at 1s. 6d., they would have to land bamboo pulp at Calcutta or Poona at about Rs. 210 a ton in order to compete, and since they would have to pay railway freight for over 600 miles in either case, the price realised at the mill could hardly be more than Rs. 180 a ton. We have no reason for thinking that production at this price could be carried on except at a heavy loss.

138. If then, for want of a market, the profitable manufac-

Possibility of manufac- ture of bamboo pulp is impossible at turing bamboo paper at Rajahmundry, the only chance of testing the Rajahmundry. soda process there would be to provide the additional capital necessary in order that the Company themselves might manufacture bamboo paper. But before a definite recommendation could be made there are several points to be cleared up. It would obviously be necessary to ascertain whether, in view of the first mortgage, which the Madras Government presumably hold on the Company's fixed assets, any further advance or guarantee of capital could be justified, whether the plant already purchased was suitable for its purpose, and whether the technical management of the Company was likely to be efficient. These are matters which call for a special enquiry by persons with expert knowledge. In addition, the Company would have to show, which it has not yet done, that in the essential points the conditions at Rajahmundry are favourable to the cheap production of bamboo paper.

139. The two points which require further investigation are the

Necessity for ascertain- ing cost of bamboo and of power and fuel at Rajah- mundry. and the probable cost of power and fuel. The Company have given no estimate of the cost of bamboo, but they state that the royalty pay-

able on bamboo taken from the Government forests is Rs. 14-8-0 a ton, and in private forests from Rs. 10 to Rs. 20. If the average royalty be taken as Rs. 15 a ton, it means an extra charge of nearly Rs. 36 per ton of paper, and bamboo on which this rate of royalty had been paid could never be cheap. Moreover, if such substantial royalties are obtainable, there must be a considerable local demand for bamboo for other purposes, and it is far from being a waste material. Finally, it appears that the bamboo must be dragged or carted for distances varying from 5 to 15 miles before reaching the river bank, and this may add considerably to the cost of transport. The question of fuel is equally important. The Company state that they propose to use both wood and coal, but will depend mainly upon wood. They have given no figure for the cost of coal at Rajahmundry, but Bengal coal at a distance of 700 miles from the coalfields must be very expensive. Wood fuel, it is said, has been purchased for

Rs. 8-8-0 a ton delivered at the mill site, and the estimate of fuel consumption per ton of paper is as follows:—

*Fuel consumption per ton of paper.*

	Coal.	Wood.
	Tons.	Tons.
Bamboo to pulp . . . . .	2	5
Pulp to paper . . . . .	1	$2\frac{1}{2}$
<b>TOTAL</b> . . . . .	<b>3</b>	<b><math>7\frac{1}{2}</math></b>

According to this estimate the cost of fuel per ton of paper (if only wood is used) would be Rs. 64, and if coal were used the cost would presumably be greater. It may be possible to make a ton of paper by burning 3 tons of coal, provided only the very best Bengal coal is used, though it has never yet been done in India, but it seems to us doubtful whether  $2\frac{1}{2}$  tons of wood could give the same results as 1 ton of Sibpur coal. Moreover firewood at Rs. 8-8-0 a ton is not cheap, and, as the mill would need about 35,000 tons of firewood annually, there is a serious risk that the price would go up. Both points require close investigation in order to determine whether, when the cost of bamboo and the cost of fuel are taken into account, the conditions are sufficiently favourable to justify assistance by Government. It is usually possible to select a site where either the fuel or the raw material is cheap, but it would serve no purpose to support a scheme if both were likely to be expensive.

140. If the results of the enquiry we have suggested are satisfactory, it would be reasonable, we think, that difficulty of testing the soda process commercially elsewhere than at the Carnatic Paper Mills, Limited, should receive either a loan or a Government guarantee of the extra capital required for the manufacture of bamboo paper at Rajahmundry. What the amount necessary would be we are unable to say, but the assistance given should be limited to Rs. 10 lakhs as a maximum as in the case of the India Paper Pulp Company. If, on the other hand, an unfavourable verdict is returned and the grant of assistance to the Rajahmundry mill is held to be undesirable, it is difficult to see how the soda process, as applied to bamboo, can be tested on a commercial scale in the near future. Possibly with Government assistance, capital might be forthcoming for the construction of a pulp or paper mill at Cuttack where the conditions are unusually favourable, or possibly part of the pulp plant at Raniganj or Titaghur

might be adapted for the manufacture of pulp from bamboo. But the latter expedient would not be altogether satisfactory. In a mill using both grass and bamboo it would not be easy to ascertain the cost of bamboo pulp with accuracy, and the cost of bamboo paper made in these mills would be higher than in an up-to-date mill. The consumption of chemicals and the quality of the pulp made can be tested in the experimental plant at Dehra Dun, but not the coal consumption or cost of production. If it proves impossible to arrange for testing the soda process on a commercial scale, it will be unfortunate, for at the end of five years some of the materials necessary for a final decision will still be wanting.

141. We turn now to the question what additional assistance, if any, the mills making paper from bamboo will require, after capital has been provided, to enable them to manufacture on an adequate scale. In this matter we are dependent entirely on the cost figures of the India Paper Pulp Company, for the Carnatic Paper Mills have not yet commenced production. The Naihati mill is a one-machine mill with an output of 2,500 tons a year, and admittedly the costs are higher than they would be if the mill were completed according to the original design. In these circumstances all that the manufacturer can fairly ask is that he should be protected against actual loss so long as the output is restricted, and should look for profits entirely to the economies resulting from a higher output. The present scale of working is admittedly uneconomic, and while this state of affairs continues the promoters are not entitled to expect that profits should be provided for them at the public expense. The overhead charges which any manufacturer whose mill was erected after the war must incur were ascertained in Chapter III (paragraph 82) and they are compared in the table below with the higher charges which the India Paper Pulp Company has to carry at present.

*Overhead charges per ton of paper.*

	As ascertained in Chapter III.	As they are at Naihati while the output is only 2,500 tons a year.
	Rs.	Rs.
Head office expenses and Agent's remuneration	15	20
Interest on working capital . . . . .	20	25
Depreciation . . . . .	50	77
<b>TOTAL</b>	<b>85</b>	<b>122</b>

The Head office and agency expenses are necessarily higher with a low output, and Rs. 20 a ton is, we think, a reasonable figure. The interest on working capital we have taken at Rs. 25 a ton as against Rs. 28 claimed by the Company, whose estimate of the working capital required (Rs. 10 lakhs) is, we think, too high. The figure taken for depreciation (Rs. 77) is in accordance with the Company's estimate and has been calculated not on the fixed capital expenditure actually incurred (Rs. 47 lakhs), but on the estimated replacement cost of the buildings and machinery, Rs. 31 lakhs approximately. The difference is accounted for partly by the sums spent on experimental work, and partly by the high prices which prevailed when the machinery was purchased, and the whole of the excess is treated as if it had already been written off. If the overhead charges estimated above (Rs. 122) are added to the lowest works costs yet attained (Rs. 442) it will be seen that the Company must realise about Rs. 564 a ton for the paper sold if they are to meet all charges and provide fully for depreciation.

Prospects of the India Paper Pulp Company if average price realised were Rs. 560 a ton. 142. It is necessary to consider what the prospects of the India Paper Pulp Company would be on the assumption that—

- (1) it had raised or been provided with the additional capital required to double its output, and
- (2) it could sell its whole output at an average net price of Rs. 560 a ton (= 4 annas a lb.).

During the first two years it is not likely that either the works costs or the overhead charges could be reduced. The new plant might begin to operate after eighteen months, but any increase in the output during the second half of the second year would be off-set by the depreciation charges on the new plant and the dislocation of work which its erection would entail. An output of over 4,000 tons in the third year and of 5,000 tons in the fourth year might reasonably be expected. In that case a fair estimate of the overhead charges would be Rs. 100 a ton in the third year, leaving a balance of Rs. 20 a ton as the return on capital, and Rs. 85 in the fourth year, leaving a balance of Rs. 35. The interest on the additional capital would absorb Rs. 15 per ton in the third year and Rs. 12 per ton in the fourth, and it is clear, therefore, that for its own profits the Company must look almost entirely to the reduction in the works costs. Even if the Company's most sanguine hopes are fulfilled, they could not, over the whole period, earn any exorbitant profit. If, for example, the works costs were Rs. 400 a ton in the third year, and Rs. 360 a ton in the fourth and fifth, the Company would realise about Rs. 250 per ton as profit in these three years after meeting all charges, providing fully for depreciation and paying the interest on the additional capital. For the whole five years the profits would be Rs. 50 a ton on the average, and the return would be a little less than 8 per cent. on Rs. 31 lakhs, which is the replacement cost of the existing buildings and plant. We do not anticipate that the works costs will decline so rapidly and we believe that the profits will be

very much less. But if in fact the Company were able to cut down expenses to the extent indicated, it could only be achieved by intense effort, rigid economy and thoroughly efficient management, and the resulting profits would be well earned.

143. The two aspects of our proposals may be summed up in this Additional Capital and way. In order that the manufacture of higher average selling bamboo paper may be kept alive during the price both necessary. next five years and its possibilities thoroughly explored, two things are necessary, *viz.* :—

- (a) The raising of additional capital not exceeding Rs. 20 lakhs in all.
- (b) An average net price for white printing and writing paper of about Rs. 560 a ton at the mill.

Neither of these remedies will suffice without the other. If the mills were assured of an average price of Rs. 560 a ton for five years, it would still be impossible to raise the extra capital at any reasonable rate of interest, both because of the risk that protection might be withdrawn at the end of the period and because the reduction in the works costs is problematic. Conversely, if the fresh capital were provided and no further assistance given, the mills would realise nearly Rs. 50 a ton less on the average for the paper sold—Rs. 513 a ton instead of Rs. 560—and the profits of the last three years, even if all went well, would do little more than cover the losses during the first two. If, as we think is probable, the reduction in works costs came about gradually rather than suddenly, there might be an actual loss on the five years' working. If assistance is to be given at all, we do not think that anything short of what we propose will suffice. There is, of course, the alternative of an immediate and final decision in favour of protection, but that course we are unable to recommend for the reasons already given. If capital is advanced or guaranteed, the liability which Government undertakes is definite and ascertained, whereas if Government were to commit itself to protection, the liability would be quite indefinite and might continue for many years to come.

144. If the future of the Paper industry depends entirely on the use of bamboo, and *sabai* grass is likely to fall more and more into the background, the assistance required might naturally be given in a form which would encourage the use of the cheaper and more abundant material. Bamboo paper can be sold at present at an average net price of Rs. 513 a ton, and, if Rs. 560 a ton or a little more is the price which is considered fair and reasonable, the payment of a bounty of Rs. 50 on every ton of paper manufactured from bamboo, would secure the desired result. It was in this direction that we were at first inclined to look for a workable scheme, but on examining the question more closely we found that the objections were serious, and in the end we were satisfied that a different course was preferable. What these objections are it is necessary to explain.

145. Had we been able to report to the Government of India First objection to that the case for according protection to bounties on bamboo bamboo paper was complete and that a final paper.

decision could now be taken, bounties on the production of paper from bamboo might well find a place in the scheme. But discriminating bounties of this kind are far more difficult to justify during a period of experiment and investigation, when the main question is still open and Government are uncommitted. To subsidise one branch of the Paper industry, leaving the other branch to look after itself, is a measure which needs special justification. We have not hesitated to express our view that bamboo is the better material and that *sabai* grass is likely to be worsted in the struggle, but that is hardly a sufficient ground for proposing measures which might directly injure the grass mills and expedite their disappearance. If bounties were given on paper made from bamboo, it might pay the India Paper Pulp Company, as soon as the second paper machine was installed, to cut prices in order to sell their output, and in that case the bounty on bamboo paper would operate prejudicially to the interests of the grass mills. Moreover, the case against *sabai* grass is not complete, for there is one locality where a grass mill could produce paper cheaply and command an important market. It would be unfair to the Punjab Paper Mills Company to grant a State subsidy to one of its competitors, when paper can be probably made as cheaply from *sabai* grass at Saharanpur as it can from bamboo at Cuttack. In these circumstances we think that the two materials must be treated alike\* and left to fight their battles on an equal footing.

146. The second objection is of a more practical kind. Since the object of the bounty must be to encourage the use of bamboo, it would be payable bounties on bamboo paper only in proportion to the quantity of bamboo the paper actually contained. In the case of paper made entirely of bamboo no difficulty arises, and a ton of paper can be treated as equivalent to a ton of pulp. If the paper contains an admixture of wood pulp, the case is not so simple, but it would not be difficult to devise a formula which would adjust the payments according to the proportion of bamboo, for the mills import wood pulp direct, and the quantities imported could be checked in the Custom House. But, if bamboo and grass were used in combination, very serious difficulties would present themselves. Clearly the bounty must be payable to any manufacturer who satisfies certain conditions, and the possibility cannot be excluded that, in order to earn the bounty, the grass mills might adapt part of their machinery and manufacture bamboo pulp for use along with grass, either in lieu of, or in addition to, imported wood pulp. We consulted the manufacturers on this point when the oral evidence was taken, but none of them was able to suggest any practical means by which the proportion of bamboo pulp in

\*This does not apply to the provision of additional capital, which is proposed in order that the possibilities of a new material may be fully explored. *Sabai* grass is not a new material.

paper produced in such circumstances could be ascertained without very elaborate administrative precautions, and our own consideration of the question has not led us to any solution of the problem. It may be suggested that the bounty might be made payable on the production of bamboo pulp and not of paper, but in a mill which manufactures pulp only for its own use and not for sale, the output of pulp cannot be ascertained with any exactness and can only be estimated approximately.

147. For the reasons given in paragraphs 145 and 146, we are

Additional assistance required should be given by the increase of the Customs duties. unable to recommend the payment of bounties on the production of bamboo paper or pulp, and we are compelled to fall back on the alternative method of an increase in

the duties on imported paper. We were reluctant to arrive at this conclusion for we recognise how strong the objections are to high duties on paper, which, in a country like India, can hardly fail to operate as a tax on knowledge and an impediment to the spread of education. About these objections there is something to be said, but before we deal with them it is desirable that we should explain exactly what our proposals are.

148. In the Trade Returns the imports of paper are classified

Exclusion of wrapping papers from the protective duties. under six\* main heads—'newsprint,' 'printing,' 'writing,' 'packing' and 'wrapping,' 'old newspapers' and 'other sorts.' Practically all the paper made in

India belongs to one or other of the first three classes, and the only exception of any importance is blotting paper, which would presumably be classed as 'other sorts' in the Customs. If protection is given at all, it must clearly extend (with certain exceptions) to printing and writing papers, and it is equally clear that 'newsprint,' 'old newspapers,' and 'other sorts,' with the exception possibly of blotting paper,† should be excluded. But the question to what extent, if at all, packing and wrapping papers should become subject to the protective duties requires further consideration. Of the imported wrapping papers the Nature Browns and the Machine-glazed Pressings enter India at prices far below the level at which any‡ paper made from Indian materials can compete, and it is chiefly Manilla and Kraft papers which have to be considered. In our view the proposal to bring these papers within the scope of the protective duties breaks down. The brown paper made at Titaghur and Raniganj may contain a proportion of *sabai* grass, but consists largely of cheaper materials such as jute and hemp waste, and it has not been shown (indeed it is not specifically claimed) that India has any natural advantage as regards these materials. An even more decisive

\*Paper manufactures (*i.e.*, articles made out of paper) and cardboard, millboard, etc., are outside the scope of this enquiry (see paragraph 21).

†See Appendix VII.

‡The Carnatic Paper Mills, Limited, propose to make a machine-glazed wrapping paper from straw at Rajahmundry, but it is impossible to say at present what the cost or the quality of this paper will be.

objection is that a protective duty on Kraft and Manilla papers would do little or nothing to facilitate the production of paper from bamboo. A certain quantity of wrapping paper has been made at Naihati from this material, but the India Paper Pulp Company are now concentrating on the production of white printing and writing papers, and the production of wrapping paper (except to meet the Company's own requirements) is negligible. It has not yet been established that a satisfactory wrapping paper can be made cheaply from bamboo, and indeed the quality of all the wrapping papers made in India leaves a good deal to be desired. It is the Kraft paper, made from sulphite wood pulp, which is steadily strengthening its hold on the Indian market, and we are not satisfied that the Indian mills can produce an equally good article. For these reasons we propose to exclude all packing and wrapping papers from the scope of the protective duties.

149. The protective duties we recommend will extend only to

Protective duties applicable to all printing and writing papers with specified exceptions. printing and writing papers, a description which covers nearly 90 per cent. of the output of the grass mills and almost the whole of the output of the Naihati mill. Here

a question of method arises whether the duties should apply generally with specified exceptions, or only to certain kinds of paper specially named in the Tariff Schedule. Our review of the conditions prevailing in the Indian paper market leads us to prefer the former alternative. There are two classes of paper which it is desirable to exclude:—

(1) Special papers which are not made in India, do not compete with Indian paper, and can be readily identified for Customs purposes.

(2) Expensive papers of high quality which the Indian mills cannot manufacture profitably.

The former class can be specifically named in the Schedule, and the latter can be dealt with by a comparatively simple expedient. But if the alternative plan is adopted, and the attempt made to specify those kinds of paper on which the duties should be placed, it is impossible to be sure that the enumeration is exhaustive. It was explained in Chapter II that each Indian paper is in competition not with one kind of imported paper but with several, and this obviously creates a difficulty. For these reasons we have found it necessary to make the protective duties generally applicable to printing and writing papers and to specify the exceptions which are not very numerous.

150. The claim that a protective duty should be imposed on 'newsprint' was withdrawn by the mills from the protective duties, as explained in Chapter II, and we discussed with the representatives of important newspapers, with the manufacturers and with the Controller of Printing, Stationery and Stamps the question how 'newsprint' should be defined for tariff purposes. The information given by

the newspapers shows that the 'newsprint' commonly imported contains about 70 per cent. of mechanical wood pulp, and if paper containing this percentage remains subject to the existing duty the newspapers will not be prejudiced. We enquired from Controller whether, by chemical or other tests, the proportion of mechanical pulp contained in a given sample of paper could be ascertained accurately, and he said he was doubtful whether it could be done. We think it should be possible, however, to determine the proportion with an error not exceeding 5 per cent., and if the tests at present used in the Controller's office are insufficient, more exact methods of estimating may be known in other countries. Our proposal is that all papers containing not less than 65 per cent. of mechanical wood pulp should remain subject to the present rates of duty on 'newsprint'. It would probably be desirable that importers of 'newsprint' should obtain from the manufacturers, and submit to the Customs authorities, certificates showing the percentage of mechanical pulp, and if that were done it would usually be unnecessary to have the paper tested, unless the Customs authorities had special reasons for suspecting that the percentage was below the limit fixed.

151. The present duties on the great bulk of the printing and writing paper imported are fixed at 15 per cent. on tariff valuations which are revised annually. The present valuations and duties

are as follows:—

	TARIFF VALUATION.				DUTY.				
	Per lb.		Per ton.		Per lb.		Per ton.		
	Rs.	A.	P.	Rs.	A.	P.	Rs.	A.	P.
<i>Printing paper.</i>									
Real Art . . . .	0	6	6	910	0	0	0	11·7	136 8 0
Imitation Art, Machine Finish, etc.*	0	4	0	560	0	0	0	7·2	84 0 0
<i>Writing paper.</i>									
Bond or Bank . . . .	0	6	6	910	0	0	0	11·7	136 8 0
Cream-laid . . . .	0	4	6	630	0	0	0	8·1	94 8 0
Mechanical cream-laid . . .	0	4	0	560	0	1	0	7·2	84 0 0

\*The complete list of papers included under this item is as follows:—Imitation Art, Machine Finish, Super-calendered, Ivory Finish, Antique, Stereo, Litho, Poster, Cartridge (other than drawing or photographic cartridge), and cover paper.

The Real Art and Bond and Bank papers valued at Rs. 910 a ton are only a small fraction of the imports, and as they do not

compete with papers made in India, the duty should, if possible, be left unchanged. The great bulk of the imported printing and writing papers are subject to duties of Rs. 84 and Rs. 94-8-0 a ton, respectively. Our proposal is that with certain specified exceptions a uniform specific duty of Rs. 140 a ton (1 anna a lb.) should be imposed on all printing and writing papers. In the result the duty on all paper which is taxed *ad valorem* will, if its value exceeds Rs. 933 a ton (6 annas 8 pies a lb.), be less than 15 per cent., and, in so far as the cost of expensive paper is reduced, the additional burden imposed on the printing industry will be lightened. The duty on Art paper and Bank and Bond paper will be almost exactly what it is at present. On the commoner kinds of printing paper the average valuation of which is Rs. 560 a ton (4 annas a lb.), the specific duty will be equivalent to 25 per cent. *ad valorem*, and on cream-laid writing paper about 22 per cent. On the cheapest wood-free printing papers the duty will be about 35 per cent. on the c.i.f. price and will be higher on the partly mechanical papers. The percentage *ad valorem* of the uniform specific duty obviously varies inversely with the value of the paper, and the conditions of the Indian paper market are such that this is the natural result of any protective scheme. It is the competition of the cheapest papers which is most severely felt by the Indian mills and they are the hardest hit by the duty; as the value increases the burden grows less, and the expensive papers, which cannot be made in India, are excluded altogether. Our detailed proposals have been embodied in a draft of the revised Tariff schedule relating to paper which will be found in Appendix VII.

152. In determining what printing or writing papers should be specifically recommended for exclusion

Principles regulating the exclusion of certain papers from the protective tariff we have been guided by several considerations. It is not enough that the paper is not made in India,

or even that it cannot be made in India. The vital points are that it does not compete with Indian paper at present, that, if excluded from the protective tariff and so made relatively cheap, it is not likely to compete, and that it should be possible to define it in such a manner that it can be readily identified for Customs purposes. The various exclusions suggested in the evidence are discussed in a Note appended to the schedule in Appendix VII, and it is not necessary to do more than give one or two examples here. The exclusion of super-calendered paper was strongly urged by the Manager of the "Times of India" on the ground that it was not made in India. It is in fact made by one mill (not from bamboo), but the important point is that, if it remained subject to the present rate of duty, it would be more largely used instead of other papers and would thus affect the sale of Indian paper. For this reason it must be brought within the protective scheme. The exclusion of 'litho' paper was advocated by lithographic printers in Bombay, but here the difficulty is of another kind. Many varieties of paper are used by lithographers, and the quali-

ties which are most important are a highly glazed surface and a paper that will not stretch. Some varieties have well-understood trade names and can be readily identified (e.g., Chrome and Flint papers), but others do not differ greatly from the paper used by printers, and in fact the Titaghur mills supply paper to lithographers in Bengal. As a description the term 'litho' paper is too vague and would lead to disputes, and it is clearly impossible to adopt the non-stretchability of the paper as a criterion. We have not found it possible to exclude 'litho' paper.

153. The effect of the proposed duty will be to increase the average price likely to cost of the imported printing paper, which be realised for bamboo competes with Indian paper by Rs. 56 a paper. ton, and of imported writing paper by Rs. 45. It is to be noted, however, that during 1924, the duty on the commoner sorts of printing paper was Rs. 89 a ton, and in considering the average price which the Indian mills were likely to realise we did not take into account the reduction of the duty to Rs. 84 a ton in January 1925. The India Paper Pulp Company, we thought, should be able to realise an average price of Rs. 513 a ton with the old rates of duty, and is not likely to realise more than Rs. 560 a ton (4 annas a lb.) with the new rate. This is the price which, in our view, the manufacturer of bamboo paper ought to receive if he is to hold his own during the next five years. We have not thought it advisable to propose different rates of duty on printing paper and writing paper, for there is not much difference in the prices of those kinds, which are the chief competitors of Indian paper, and, if the attempt were made to discriminate, it might sometimes be difficult for the Customs authorities to decide whether a particular consignment should be classed as 'printing' or as 'writing'.

154. Our estimate of the amount of protection necessary is based entirely on the cost figures of the India Paper Pulp Company, and the average price of Rs. 560 a ton was arrived at without taking into account the needs of the grass mills. It is desirable, however, that we should state briefly how they are likely to be affected if the duty on imported printing and writing papers is raised to Rs. 140 a ton. The average price, which we estimated that the Titaghur Mills were likely to realise with the present duties, was Rs. 502 a ton, but in order to sell their full output they would be compelled to drop prices still further. The average price likely to be realised by the Bengal Mill at Raniganj we took to be Rs. 478, owing to the higher proportion of brown and "badami" paper in their output. The cost of production also ought to be less than at Titaghur, given equal efficiency in both mills, though whether this would in fact be the case is open to doubt. About 10 per cent. of the Titaghur production would probably be unaffected by the new duties, and if allowance is made for this, the average price likely to be realised is Rs. 545 a ton, leaving a balance of Rs. 55 a ton over the works costs taken at

Rs. 490 a ton. This margin might, however, be increased to some extent if, by dropping the average selling price to Rs. 520, the full output could be sold, for in that case the works costs might be expected to drop to about Rs. 460, leaving a balance of Rs. 60 a ton. This, we think, is a fair estimate of the benefit the grass mills may derive from the new duties.

155. We estimated that Rs. 35 a ton was sufficient to cover Probable results of the protective duties to the grass mills. the Head office and agency expenses and the interest on working capital, and if this sum is deducted from Rs. 60, the amount available for depreciation is Rs. 25 a ton, or exactly half the allowance necessary for a mill erected since the war. The actual requirements of the existing mills naturally vary according to their circumstances. The Bengal Company calculate that about

Rs. 21 a ton would suffice to meet interest on working capital and Head office expenses, leaving a balance of Rs. 39 a ton, to cover depreciation and profits. The interest charges payable by this Company are low, as it is able to provide part of its working capital from its own resources. What the Head office and agency expenses of the Titaghur Company amount to has never been made plain, but for interest charges they require about Rs. 27 a ton, which must apparently cover not only the working capital proper, but the amounts borrowed to meet the accumulated losses of the last two or three years. Depreciation is taken by the Company at the very low figure of Rs. 17 a ton. The margin of Rs. 60 a ton over works costs may suffice to cover the overhead charges of both Companies, but there can be no profits unless the provision for depreciation is rigidly restricted. In one sense there is no objection to such restriction, for the block accounts have been heavily written down and stand at very moderate figures. But the result would be that the mills, with an equipment growing more and more obsolete, would find increasing difficulty each year in meeting the competition of up-to-date mills either in Europe or in India. A surplus of Rs. 60 over works costs would not, in any real sense, leave them a margin of profit.

156. It was no part of our object to adjust the scheme of protection so as to permit the grass mills to survive, and their disappearance would not ultimately endanger any important national interest. What the actual course of events may be it is difficult to forecast. It is possible, especially if the reconstruction scheme contemplated by the Directors of the Titaghur Company is approved, that the three mills in Bengal which use grass may still be working at the end of five years. It is not likely in any case that all will go under, for the closing down of one four-machine mill would make it much easier for the others to sell their output. We do not believe that in the long run the grass mills can hold their own in competition with bamboo paper, except in Upper India. But if they remain in existence until the time comes when the intensive development of the bamboo Paper and

Some or all of the "grass" mills likely to survive for the next five years.

Pulp industries is likely to be profitable, one advantage at any rate will be secured. The immediate shutting down of the mills would mean the dispersal of the workmen, who have been trained during the last forty years, and the bamboo mills would have to train their workmen from the start.

157. We have deprecated indiscriminate investment in new protective duties not paper-making enterprises at present, and the likely to encourage new question may be asked whether the increase enterprises. of the duties to Rs. 140 a ton may not have that result. We do not regard this as at all probable for the protection we have proposed falls greatly short of the amount required to make paper-making in India profitable under present conditions. It is possible, however, that the duties may facilitate the raising of capital by the Punjab Paper Mills Company for their projected mill near Saharanpur, and also perhaps by others for the manufacture of bamboo pulp near Cuttack. If this came about, there would be no cause for regret, for the natural conditions are apparently more favourable to cheap production in these two places than anywhere else in India.

158. The total quantities of paper, the price of which is likely to be increased by the new duties, cannot in any case exceed 47,000 tons. The imports of printing and writing paper into India amounted to 20,000 tons in 1924-25 and the Indian production of paper of all kinds was certainly less than 27,000 tons. A deduction of 10 per cent. from the imports would probably cover the printing and writing papers specifically excluded and the expensive papers not affected seriously, or not at all, by the higher duty. The Indian production includes packing paper and some other miscellaneous items on which the duty will be unchanged, and at least 3,000 tons must be deducted on this account. The net quantity of paper of which the price will be raised is therefore 42,000 tons of which 18,000 tons is imported and 24,000 tons made in India. This is, we think, a maximum estimate, and since the increase in the duty cannot be more than Rs. 50 a ton on the average, the extra price paid by the consumer cannot exceed Rs. 21 lakhs a year. There are, however, reasons for believing that the burden will be very much less. This would be the case if the mills adopted the policy of lowering prices to sell their output. A decrease of Rs. 25 a ton in the price might result in a reduction of the imports by 4,000 tons, with a corresponding increase in the Indian production. In that case the consumer would pay only Rs. 25 a ton extra on 28,000 tons, and the burden imposed by the protective duties would drop from Rs. 21 lakhs to Rs. 14 lakhs. Our belief is that the increase in the cost of paper to the Indian consumer would certainly be less—and probably a good deal less—than Rs. 20 lakhs a year.

159. Any increase in the cost of paper inevitably makes books more expensive and so impedes the spread of knowledge and the progress of education, and an extra payment of between Rs. 15 lakhs

Additional duties bring prices back to the 1s. 4d. level.

and Rs. 20 lakhs a year is not negligible, even though the burden is ultimately borne by a large number of persons. We should have been glad if it had been possible to make recommendations which left paper as cheap as it was before, but, for reasons already explained (paragraphs 145 and 146), we are unable to do so. It may be worth while, however, to make it clear exactly what the position will be if our proposals are accepted. Even if the whole cost of the extra duty is passed on to the consumer, he will pay no more on the average for the cheaper writing and printing papers than he would have paid if the rupee sterling exchange had remained at 1s. 4*d.* and the duties had been left unchanged. This point can best be illustrated by a concrete instance. The c.i.f. price of super-calendered paper was quoted to us as £32 a ton, equivalent to Rs. 480 with the exchange at 1s. 4*d.*, and the duty-paid\* cost is Rs. 569 a ton. With the exchange at 1s. 6*d.* the c.i.f. price drops to Rs. 427 a ton, and the addition of the duty of Rs. 140 raises the landed cost to Rs. 567 a ton. The rise in the exchange may have kept the rupee prices of many articles stable when the general trend of world prices was upwards. But this is emphatically not true of paper, for the rise in the exchange has caused a fall in prices which puts the Indian mills in a very perilous position. If the 1s. 4*d.* rate had continued, it is probable that a very small increase in the duty of about Rs. 15† a ton would have sufficed.

160. It was urged by the representatives of the Printing industry, who gave evidence, that that industry would suffer severely if the cost of paper were raised, and that there was a grave danger that work at present done in India, especially

Higher duties not likely to prejudice the Printing industry.

the printing of advertising catalogues and similar publications, would go out of the country. We think these apprehensions are exaggerated. We made repeated enquiries, but no witness could bring to notice a case in which an order or contract had been lost owing to the competition of foreign printers, and if the danger point were near we should have expected that many such cases would have been reported. On the other hand, there is evidence which indicates that the Indian printer has a substantial margin of advantage over his foreign competitors. Mr. Ascoli mentioned that the Government of India had found it cheaper to re-print War Office Manuals in India than to import copies, and also told us that British firms had printing work executed in Madras and sent out paper from England for the purpose. No good grounds have been given for supposing that the higher duties we propose will seriously prejudice the Printing industry, for the cost of paper will go up by 10 per cent. approximately and the increase in printing costs should be less than 4 per cent.

---

\* The landing charges are the same in both cases and are omitted.

† The mills save about Rs. 15 per ton of paper in the cost of chemicals and imported pulp, owing to the rise in the exchange.

161. The probable effect on the Customs Revenues of the new duties can only be estimated approximately.

Effect of the protective duties on the Customs Revenues. We do not anticipate that the higher duties will lead to any decrease on the total consumption of paper in India, though the

growth of consumption may be retarded. If imports continued on the same scale as at present, an increase of Rs. 9 lakhs a year might be expected (*i.e.*, Rs. 50 a ton on 18,000 tons), but it is more probable, at any rate after the first year, that the Indian production will displace part of the imports. The reduction in imports might be about 4,000 tons, and in that case the duty would be Rs. 140 a ton on 14,000 tons, *i.e.*, Rs. 19.6 lakhs instead of Rs. 90 a ton on 18,000 tons, *i.e.*, Rs. 16.2 lakhs, an increase of Rs. 3.4 lakhs. A closer calculation is hardly possible, but even if allowance be made for a gradual increase in the Indian production at the expense of imports during the quinquennium, we believe that the increase in the Customs Revenue will go far to cover the liabilities which Government may incur by the advance or guarantee of capital to companies manufacturing paper or pulp from bamboo.

162. We have now completed our review of the conditions

Final appreciation of the conditions which necessitate protection. affecting the Paper industry in India, and explained the measures which we consider necessary. We have found that, if the paper

mills had to depend solely on *sabai* grass as their staple material, they could not in the long run hold their own in competition with imported paper, except in one region of Upper India. In bamboo, however, the Indian paper-maker has a raw material which is much more abundant and more widely distributed and holds out the promise of cheaper production. If cheap coal were to be found in all Provinces instead of in one restricted area, or if India's potential resources in hydro-electric power were greater than they appear to be, the manufacture of bamboo paper might be firmly established in a very few years. As things are, the development of the Paper industry, as of several others, is likely to be retarded by the long distances which separate the raw materials from the supplies of power and fuel. Nevertheless, notwithstanding this natural disadvantage, Indian's abundant supplies of bamboo are likely to become the basis of a considerable industry, capable not only of meeting the country's requirements of paper, but of exporting substantial quantities of paper pulp. If the world prices of paper were likely to remain at their present level, it might be many years before Indian bamboo could profitably be developed as the raw material of pulp and paper. But the rapid diminution, both in Europe and America, of the supplies of coniferous wood suitable for pulping justifies a belief that an increase in the price of paper is inevitable, though it may be slow. It is this most important factor which makes it worth while for the Government of India to take action now to assist the manufacture of paper from bamboo. But the situation demands careful hand-

ling, both because the increase in world prices may come about slowly and because there is much preliminary work still to be done before the process of manufacture most likely to lead to cheap production can be determined, and costs reduced to a minimum, by perfecting the processes in all their details. An immediate and final decision in favour of protection might lead to a premature development entailing great expense to the tax-payer or a heavy burden on consumers of paper for a number of years. What is essential at present is that the manufacture of bamboo paper should be continued, and the exploratory work be completed, so that when the opportunity comes it will not be necessary to spend years on investigation before the development of the industry can begin. It is on this basis that our proposals have been drawn up.

163. In effect what we propose is that the consumers of the commoner kinds of printing and writing paper should forego for the next five years the advantage they derive from the rise in the rupee sterling exchange from 1s. 4d. to 1s. 6d. In addition we have recommended that Government should assist the industry by taking upon its own shoulders the liability for the additional capital which must be found if the possibilities of the two alternative processes for making bamboo pulp are to be fully explored. When account is taken of the increased revenue likely to be drawn from the Customs duties on paper, and the value of the fixed assets which would be pledged as security for the Government loan or guarantee, it seems probable that at the end of five years, even if the manufacture of bamboo pulp and paper were finally abandoned, there would be no actual loss to the tax-payer. We believe that the advantages likely to accrue from the eventual establishment of the manufacture of bamboo paper and pulp as a considerable industry are sufficient compensation for the temporary sacrifice which the country is asked to make, and we are satisfied that nothing less will suffice to secure the objects in view. The issue which the Government of India and the Legislature will have to decide is clear and well defined. If no assistance is given, it is probable that the manufacture of paper in India will cease, with a somewhat remote prospect of revival when wood pulp has grown very dear. The question for decision, therefore, is whether it is worthwhile to keep the industry going at what in all the circumstances is a moderate cost, or whether it must be left to its fate. For our own part we feel strongly that the disappearance of the industry at the moment when the use of bamboo opens up fresh avenues of development in the future would be very regrettable, and we believe that the proposals we have made are in accordance with the national interest.

164. It would be ungracious if, in bringing to a conclusion a somewhat laborious enquiry, we did not once more acknowledge the help we have received from the witnesses who gave evidence. Our demands for information imposed a heavy burden

on the applicants for protection, and we are grateful for the readiness and courtesy with which they were met. To the India Paper Pulp Company we are particularly indebted for the care and thoroughness with which their written evidence was prepared and for the information they were able to supply as to the cost of paper and pulp manufacture in Europe. Amongst those who gave evidence as consumers of paper or as opponents of protection we would single out the Calcutta Paper Traders' Association, whose written statement was most helpful in enabling us to appreciate the conditions prevailing in the Indian paper market. Finally, we are under a deep obligation to Mr. Pearson and Mr. Raitt of the Forest Research Institute at Dehra Dun, who have devoted many years to the study of paper and pulp manufacture in India and were in a position to supply very valuable information. We have not hesitated to form our own judgment on all the issues that came before us, but there are aspects of the case with which we could hardly have dealt at all, had we not had at our disposal the results of their labours.

165. The hearing of the evidence in the various enquiries

*Recommendations unani-* mous, though Report signed by two Members only.

entrusted to the Board by the Resolution of the Government of India in the Commerce Department, No. 38-T, dated the 10th April 1924, was concluded at the end of December 1924. During January and February 1925, the Reports on Cement, Printer's Ink and Magnesium Chloride were completed, and after a full discussion of the issues involved in the claim to protection for the Paper and Paper Pulp Industries, the Board arrived at unanimous conclusions. Our colleague, Mr. Ginwala, was compelled on grounds of health to take leave out of India at the end of February, and it was impossible before his departure to draft our Report on Paper. In these circumstances, we drew up and signed on the 26th February a summary of our recommendations, which is printed as an Annexure to this Report. The recommendations placed before the Government of India have, therefore, the unanimous support of all the Members of the Board, although in drawing up the Report in which they are explained and justified we have not had the advantage of Mr. Ginwala's co-operation and criticism. For the manner in which the facts have been presented, and the various aspects of the case reviewed, the responsibility is ours alone. But whilst writing the Report we have had constantly before our minds the discussions which took place before Mr. Ginwala left us, and our endeavour throughout has been to adhere closely to the general line of argument which was settled by the Board as a whole.

G. RAINY—*President.*

V. G. KALE—*Member.*

G. C. F. RAMSDEN—*Secretary.*

*May the 5th, 1925.*

## ANNEXURE.

*Summary of the Board's Recommendations.*

The proposals which we desire to submit to the Government of India may be summarised as follows:—

(1) In order that possibilities of the manufacture of paper in India from bamboo may be fully explored, the Government of India should provide the capital required—about Rs. 10 lakhs—in order to enable the India Paper Pulp Company to increase the output of its mill at Naihati from 2,500 to 5,000 tons a year. This might be done either by an advance of capital secured by mortgage on the fixed assets of the Company, or by the guarantee, in respect both of principal and interest, of a public issue of debentures. We prefer the latter alternative, because it would permit the immediate participation of Indian capital in the enterprise.

(2) We recommend that the payment of interest should be waived during the first two years, if the capital is advanced by the Government of India, or in the alternative, if the capital is guaranteed, that the interest due to the debenture holders should actually be paid by the Government of India, irrespective of the ability of the Company to meet these charges.

(3) The India Paper Pulp Company use the sulphite process for the manufacture of paper. There is an alternative process which has not yet been applied to bamboo on a commercial scale, *viz.*, the soda process, and it is desirable that its possibilities also should be fully investigated. The Carnatic Paper Mills, Limited, apparently intend to make paper from bamboo by the soda process, but at present their equipment is incomplete, and they are not in a position to commence manufacture. At the stage which this project has reached, it is not possible for us to make a definite recommendation, but it is desirable that this scheme should be examined by the technical advisers of the Government of India, and that, if the Company are able to show reasonable prospects of success, they should be assisted to raise the additional capital required in the same manner as the India Paper Pulp Company.

(4) We think that the total capital in respect of which the Government of India will incur liabilities may reasonably be restricted to Rs. 20 lakhs in all.

(5) We recommend that in place of the existing 15 per cent. *ad valorem* duties on printing paper and writing paper a specific duty of 1 anna a lb. should be imposed on all writing paper, and on all printing paper other than 'newsprint' containing 65 per cent. or more of mechanical pulp.

No change is proposed in the duties on other kinds of paper.

G. RAINY—*President.*

P. GINWALA }  
V. G. KALE } *Member.*

G. C. F. RAMSDEN—*Secretary.*

*February the 26th, 1925.*

## APPENDIX I.

*Capacity and output of the five principal Indian Paper mills.*

*(Showing also the dates when the Companies were formed and manufacture commenced.)*

Name of Mill.	Situation of mill.	Date when Company was formed.	Date when manufacture commenced.	Full capacity for production.	Average annual output 1911-1914.	Maximum output in any year.	Output 1923.	Number of machines.
1. Upper India Conper Paper Mills Company, Limited.	Lucknow	1879	1882	4,000	3,000	3,678	1,699	2
2. The Titaghur Paper Mills Company, Limited.	Titaghur and Kankinara.	1882	1884	20,000	17,135	20,719	15,585	8
3. The Decean Paper Mills Company, Limited.	Poona	1886	1887	1,700	1,052	1,316	Nil*	1
4. Bengal Paper Mill Company, Limited.	Raniganj	1889	1891	8,400	6,061	6,597	6,565	4
5. India Paper Pulp Company, Limited.	Naihati	1918	1922	2,750	Nil	2,435	2,435	1
					36,850	27,248	26,284	16

\* This Company has not given its output for any year after 1918-19.

APPENDIX III.  
*Analysis of the Works Costs of the Indian Paper mills.*

LITAGHUR PAPER MILLS COMPANY.		BENGAL PAPER MILLS COMPANY.		INDIA PAPER PULP COMPANY.			
Actuals.	Estimated costs.	Actuals.	Estimated costs.	Actuals.	Estimated future costs.	Actuals.	Estimated future costs.
1923-24.	April-Oct. 1924	1923-24 with full output.	1923- Future, with full output.	1923-24 Future, with output of 7,880 tons.	April to September 1924.	Output 5,000 tons.	Output 5,500 tons.
Rs. per ton.	Rs. per ton.	Rs. per ton.	Rs. per ton.	Rs. per ton.	Rs. per ton.	Rs. per ton.	Rs. per ton.
118.94	124.30	124.30	89.72	102.23	230*	100.24	74
105.86	101.63	101.63	86.00	99.88	50	40.37	80
93.47	73.01	73.01	62.57	112.10	..	119.18	95
76.81	73.69	61.04	57.61	70.57	64	66.08	61
76.21	53.23	53.23	50.00	68.95	45	56.64	53
52.56	51.86	42.95	34.67	42.44	31	41.36	31
16.63	14.53	12.04	12.00	22.92	19	33.25	48
<b>Total</b>	<b>540.48</b>	<b>492.34</b>	<b>468.20</b>	<b>392.17</b>	<b>519.09</b>	<b>457.12</b>	<b>442</b>
						<b>349.21</b>	<b>340.47</b>
						<b>327.56</b>	<b>318.23</b>

\* This figure includes both primary and auxiliary materials.

APPENDIX III.

*Analysis of the cost of salai grass used by the Indian Mills.*

TITAGHUR MILLS.				BENGAL MILL.			
ACTUAL COST 1923-24.				ESTIMATED COST WORKING THE FIELDS TO CAPACITY.			
Western Circle.	Nepal.	Other areas.	Western Circle.	Nepal.	Chota Nagpur.	Ramnagar.	
Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	
per ton.	per ton.	per ton.	per ton.	per ton.	per ton.	per ton.	
47.44	9.09	..	10.63	5.89	9.28	23.63	
25.38	23.82	..	25.38	23.82	26.16	22.78	
13.64	13.92	..	13.64	13.92	9.0	13.82	
25.97	10.21	..	3.40	10.21	11.81	4.54	
<b>Total</b>	<b>112.43</b>	<b>57.04</b>	<b>48.06</b>	<b>53.05</b>	<b>53.84</b>	<b>56.25</b>	<b>64.77</b>

## APPENDIX IV.

*Note on the quantity of sabai grass required to make a ton of paper.*

The Board spent some time during this enquiry in investigating the proportion of the various raw materials required to make a ton of pulp of paper, and especially *sabai* grass. All the evidence was to the effect that 3 tons of *sabai* grass was required to make a ton of paper, provided no account was taken of the weight of the sizing and loading materials added. But the Titaghur Mills and Mr. Raith, the Government Cellulose Expert, divided the wastage differently as between pulp manufacture and paper manufacture. If the grass as it reaches the mill is taken as 100, the figures are as follows:—

	Grass.	Pulp.	Paper.
According to the Titaghur Mills . . .	100	44.4	33.3
According to Mr. Raith . . .	100	40	33.3

The point is to some extent an academic one because *sabai* grass pulp is not manufactured for sale, and as it remains moist throughout the process of manufacture, the exact quantity produced can only be estimated. It would seem, however, that Mr. Raith's calculation is the more acceptable. The Titaghur representatives who gave oral evidence informed us that the loading and sizing materials on the average made good the wastage between pulp and paper. But it hardly seems possible that these materials should amount to 25 per cent. of the weight of the finished paper as it leaves the mills. According to Mr. Raith's calculations, the wastage between pulp and paper is only 16½ per cent., and the loading and sizing might be near this figure.

2. An examination of the works costs of the grass mills confirms the view that the quantity of *sabai* grass required to make a ton of pulp cannot be as low as  $2\frac{1}{4}$  tons in the ordinary practice of the mills. In 1923-24 the Titaghur Mills used 5,964 tons of imported pulp in the production of 15,036 tons of paper. If allowance is made for 10 per cent. moisture in the imported pulp, the quantity of imported pulp used comes down to 5,368 tons, which is 35.6 per cent. of the weight of finished paper. The corresponding figures for the Bengal Mill are 2,580 tons of imported pulp (2,322 tons if allowance is made for the 10 per cent. moisture) to produce 6,565 tons of paper, and the percentage is 35.4. It is assumed, in accordance with the evidence, that the wastage of fibre between pulp and paper is in fact made good by sizing and loading materials. On that basis, the cost of primary materials per ton of paper, as given by the mill, can be scrutinised. Other things besides grass are included under primary materials, *e.g.*, rags, jute, hemp and waste paper, but as they are used mainly for the cheaper kinds of paper, it must be presumed that they are less expensive than *sabai* grass. Their in-

clusion cannot, therefore, make the cost of primary materials higher than the cost of *sabai* grass alone, though it may make it lower. The cost of primary materials can, therefore, be treated as the cost of *sabai* grass without any danger of exaggerating the figures. These are tabulated below:—

	Cost of primary materials per ton of paper, using 35 per cent. imported pulp.	Equivalent cost if no pulp had been used.	Equivalent cost of <i>sabai</i> grass per ton according to the quantity required to make a ton of paper.			
			Tons. $2\frac{1}{4}$	Tons. $2\frac{1}{2}$	Tons. $2\frac{3}{4}$	Tons. 3
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Titaghur Mills, 1923-24	119	183	81	73	67	61
Titaghur Mills, April to September 1924.	124	191	85	76	69	64
Bengal Mill, 1923	102	157	70	63	57	52

The Titaghur Mills gave the cost of the grass collected in 1922-23 as Rs. 60 a ton, and in 1923-24 as Rs. 70 a ton. The Bengal Mill cost in 1923 was a little below Rs. 60 a ton. The inference from the figures would seem to be that if the cost of primary materials is taken as equivalent to the cost of *sabai* grass, the mills have been using not  $2\frac{1}{4}$  tons to make a ton of paper, but  $2\frac{3}{4}$  tons. If, on the other hand, the cost of *sabai* grass is taken (as it ought to be) as higher than the average cost of all primary materials, the mills must have been using nearly 3 tons of grass per ton of finished paper. If the weight of the sizing and loading materials is taken as one-sixth of the weight of the paper, then  $3\frac{1}{2}$  tons of grass are required to make a ton of paper before these materials are added, which would be equivalent to a 28 per cent. yield instead of a 33 per cent. yield. In the text of the Report it has been assumed that  $2\frac{1}{2}$  tons of grass are necessary to produce one ton of finished paper, taking into account the weight of the sizing and loading which is customary for the kinds of paper made in India. It ought to be possible to work at this rate, but apparently the mills have not succeeded in attaining it in the last two years.

## APPENDIX V.

*Estimated cost of manufacturing bamboo pulp.*

	MILL AT CUTTACK.		MILL NEAR CHITTAGONG.
	5,000 tons (dry).	10,000 tons (dry).	6,000 tons (dry).
Bamboo . . . . .	30.0	32.5	41.0
Chemicals . . . . .	32.0	36.0	49.4
Coal . . . . .	22.5	22.5	33.7
Labour . . . . .	20.0	12.0	16.8
Superintendence . . . . .	5.0	5.0	5.5
Repairs . . . . .			8.8
Miscellaneous . . . . .	10.0	9.0	3.8
Margin for contingencies . . . . .	14.6	13.2	...
Total Works Costs . . . . .	138.1	130.2	162.0
Head Office expenses and Agents' remuneration.	nil	nil	7.2
Interest on working capital . . . . .	4.5	3.8	3.5
Depreciation . . . . .	21.9	13.8	27.1
All-in cost . . . . .	163.5	147.8	199.8
Return on fixed capital . . . . .	27.2	16.8	36.0
Freight to Calcutta . . . . .	19.0	19.0	12.0
Fair selling price . . . . .	209.7	183.6	247.8

In the comparative table, recent estimates of the cost of manufacturing bamboo pulp in India have been tabulated. The first two columns are the alternative estimates prepared by Mr. Raith for a mill at Cuttack, according as its output was 5,000 tons or 10,000 tons. The third column contains the estimate of the India Paper Pulp Company for a 6,000 ton mill near Chittagong. In order

that the estimates might be comparable, the interest on working capital has been taken at  $7\frac{1}{2}$  per cent. and the return on fixed capital at 8 per cent. in all three estimates.

2. The estimate of the cost of bamboo at Cuttack appears unduly sanguine, at any rate for the early years of manufacture. The difficulty the India Paper Pulp Company have found in extracting sufficient quantities of bamboo from the Kasalong reserve shows clearly that the cost may prove far higher than was originally anticipated. It is unsafe to take the cost of bamboo per ton of pulp at less than Rs. 50, even when the mill has been working for four or five years.

3. Cuttack, where the soda process will probably be used, has an advantage of Rs. 13 a ton in the cost of chemicals. It is to be remembered, however, that the application of the soda process to bamboo is still at the experimental stage, and it is impossible to be sure that it will eventually prove cheaper than the sulphite process in this respect. The Chittagong figure of Rs. 49 is conservative and may be bettered.

4. The consumption of coal is taken at  $1\frac{1}{2}$  tons per ton of pulp in all three estimates, but whereas at Chittagong it is proposed to use the very best Sibpur coal, the coal at Cuttack will come from the new Talcher field only 65 miles away. It is not safe to reckon on less than 2 tons of coal per ton of pulp at Cuttack, but owing to the fall in the price of coal since 1923, the figure of Rs. 22.5 taken on the Cuttack estimates is still sufficient. Under this head Cuttack has an advantage of Rs. 10 a ton.

5. In the Cuttack estimate the costs of 'labour', 'superintendence' and 'repairs' are probably under-estimated, but a high figure is taken for 'miscellaneous'. The Chittagong figures for 'labour' and 'repairs' also appear to be sanguine.

6. The provision in the Cuttack estimates of a margin for contingencies seems to be sufficient to cover all under-estimating except under the head "cost of bamboo", which must be increased by Rs. 20. The Chittagong estimate should be raised by Rs. 6 under the "cost of bamboo" and by Rs. 5 as a margin for contingencies.

7. The total works costs, with the additions mentioned in paragraph 6, become—

	Rs.
Cuttack (5,000 tons) . . . . .	158
Cuttack (10,000 tons) . . . . .	150
Chittagong (6,000 tons) . . . . .	173

The higher costs at Chittagong are ascribable almost entirely to coal.

8. The figure of Rs. 7 for 'Head office expenses' and 'Agents' remuneration' is a reasonable one. An addition of this amount must be made to the Cuttack estimates for a 5,000 ton

mill, which contains no specific provision of this kind. A sum of Rs. 5 should suffice in the case of the 10,000 ton mill.

9. The fixed capital expenditure on the three mills has been estimated as follows:—

*Estimated fixed capital expenditure.*

	Total Rs. lakhs.	Per ton of output. Rs.
Cuttack (5,000 tons) . . . . .	17	340
Cuttack (10,000 tons) . . . . .	21	210
Chittagong (6,000 tons) . . . . .	27	450

The India Paper Pulp Company, having recently erected a mill at Naihati, are in a position to form a much closer estimate of the fixed capital expenditure involved in the erection of a pulp mill than Mr. Raith could do. The cost of the 5,000 ton mill cannot be taken at less than Rs. 25 lakhs, and the 10,000 ton mill at less than Rs. 30 lakhs.

10. The allowance for depreciation in the Cuttack estimates must be increased as follows:—

5,000 ton mill—Rs. 22 to Rs. 31, *i.e.*, by Rs. 9.

10,000 ton mill—Rs. 14 to Rs. 19, *i.e.*, by Rs. 5.

11. With the modifications indicated in paragraphs 6, 8, and 10 the all-in costs become—

	Rs.
Cuttack (5,000 tons) . . . . .	199.5
Cuttack (10,000 tons) . . . . .	177.8
Chittagong (6,000 tons) . . . . .	210.8

12. The return on fixed capital must be raised in the Cuttack estimates as follows:—

5,000 tons      Rs. 27 to Rs. 40, *i.e.*, by Rs. 13.

10,000 tons      Rs. 17 to Rs. 24, *i.e.*, by Rs. 7.

13. The railway freight from Cuttack to Calcutta at Rs. 19 a ton seems extraordinarily high, and probably a reduced rate on waggon-loads would be obtainable.

14. In view of the modifications suggested in paragraphs 6, 8, 10 and 12 the fair selling price at Calcutta becomes—

	Rs.
Cuttack (5,000 tons) . . . . .	258.7
Cuttack (10,000 tons) . . . . .	220.6
Chittagong (6,000 tons) . . . . .	258.8

15. If the export of pulp is what is contemplated, the pulp mill should not have a smaller output than 10,000 tons. It is therefore the estimate for the 10,000 ton mill at Cuttack that is important. In competition with a similar mill at Chittagong it would have an advantage of Rs. 10 or Rs. 12 a ton in the Calcutta market on account of the lower cost of coal. For export purposes the two mills would be practically on an equality, for the freight from Chittagong to Calcutta would be eliminated. Except in the cost of coal it is not demonstrable that Cuttack has any substantial advantage over Chittagong.

16. The figures suggest that a favourably situated mill with a capacity of 10,000 tons might, after three or four years' working, when its initial difficulties had been overcome, ship bamboo pulp for export at about Rs. 220 a ton f.o.b. and still make a reasonable profit. It is not suggested that Rs. 220 a ton is the lowest figure attainable. Eventually the cost of production may be lower, and even considerably lower, but this is all that is fairly in sight at present.

---

## APPENDIX VI.

*Note on the equipment of the grass mills in Bengal.*

In several paragraphs of the Report (see paragraphs 68, 69, 75, 118, 125, 128, 140, 155) allusion has been made to the fact that the plant and machinery of the grass mills in Bengal is not up-to-date, and that the cost production is increased thereby. The point could only be discussed fully by persons possessing the requisite technical experience, but it is desirable to explain briefly the reasons which influenced the Board in forming their opinion. In the first place, there is the undoubted fact that the coal consumption at Kankinara is too high and at Raniganj is much worse, while even at Titaghur, where the steam plant has been renovated since the war, it does not compare very favourably with the consumption at Naihati. But it is not only the steam equipment which has become obsolete. When Mr. Carr was giving evidence for the Bengal Paper Mill Company in December 1924, the point was put to him that the coal consumption suggested that the steam plant at Raniganj was not all that it should be, and his answer was—"Unquestionably we could improve it, but if we were to make it to-day, I don't think that it would stand very high in our list of improvements" The position, therefore, is that the management of a mill which is striving to reduce its coal consumption to six tons per ton of paper—at least one ton more than ought to be necessary—does not regard the renovation of the steam plant as very urgent, because there are so many other improvements which are more urgent. The inference clearly is that the whole plant is very far from up-to-date.

2. There are other facts which suggest that the high costs in the grass mills are due in part to the plant and machinery. The 'breaker' equipment of all of them must be regarded as obsolete (see paragraph 11 of the Report), and this means unnecessary expenditure on coal and labour. In addition many of the paper machines in the mills are old, some of them having been taken over from earlier mills, now defunct. It may be true, as was suggested in the evidence, that a paper machine may have a long and useful life, provided minor improvements are introduced from time to time so as to keep abreast of new inventions. But for many years before the war the mills were hard put to it to keep their heads above water, and could spend little on renewing their plant and machinery. Large sums have been spent for this purpose since the war out of war profits, but admittedly these have not sufficed to do all that is required.

3. The Titaghur Company has spent on the Titaghur mill most of the funds available for improvements, and the Kankinara mill is inferior in several respects, *e.g.*, the absence of a soda recovery plant and the inefficiency of the boiler plant. But whereas the Kankinara mill is well laid out, and the arrangement of the plant is such as to facilitate cheap production, this is not the case at Titaghur. The members of the Board visited both mills in August

1924, and the impression produced on the minds of all of them was that the grouping of the various sections of the plant at Tita-ghur left much to be desired, and that it was exceedingly difficult to follow the sequence of the various manufacturing processes. This defective arrangement may be due to the fact that the layout of the buildings was not originally intended for a paper mill, and the representatives of the Company stated, when giving oral evidence in December 1924, that the arrangement was now much better than it had been formerly. A further assurance was given that it might now be taken to be satisfactory, but the members of the Board found themselves unable to assent to this conclusion.

4. It was on account of the reasons given above that the members of the Board formed the opinion that the high costs in the grass mills were due in part to the nature and arrangement of the plant and machinery.

## APPENDIX VII.

*Proposed sections of the Tariff Schedules embodying the Board's recommendations.*

	Per	Tariff Valuation.	Duty.
Paper and articles made of paper and <i>papier mâché</i> , pasteboard, millboard and card-board, all sorts, and stationery, including ruled or printed forms and account and manuscript books, drawing and copy books, labels, advertising circulars, sheet or card almanacs and calendars, Christmas, Easter and other cards, including cards in booklet form, including also wastepaper and old newspapers for packing except old newspapers in bales and bags, but excluding trade catalogues and advertising circulars imported by packet, book or parcel post (see No. 100) and also excluding the descriptions given below:—	..	<i>Ad valorem</i>	15 per cent.
Old newspapers in bales and bags . . .	Cwt.	Rs. A. P.	15 „ „
Printing paper—			
<u>Chrome, marble, flint, poster and stereo</u>	..	<i>ad valorem</i>	15 „ „
<u>Glazed and unglazed, containing not less than 65 per cent. of mechanical wood pulp—</u>			
White or grey . . . .	lb.	0 2 3	15 „ „
Coloured . . . .	”	0 2 6	15 „ „
<u>Other sorts, white or coloured</u> . . .	lb.	Specific	1 anna
Packing and wrapping paper—			
Nature brown and machine-glazed pressings and machine-glazed wrappings.	„	0 2 3	15 per cent.
Manilla, machine-glazed or unglazed, and sulphite envelope.	„	0 2 9	15 „ „
Kraft and imitation kraft . . . .	„	0 3 3	15 „ „
Other sorts, including tissues . . .	..	<i>ad valorem</i>	15 „ „
<u>Writing paper, all sorts</u> . . . .	lb.	Specific	1 anna
Straw boards . . . . .	Cwt.	8 0 0	15 per cent.

*Note on the proposed sections of the Tariff schedule.*

In the revised Tariff Schedule relating to paper the changes made have been underlined. It will be seen that:—

- (1) No change has been made except as regards printing and writing papers.
- (2) The existing duties on newsprint are retained where the paper contains not less than 65 per cent. of mechanical wood pulp. It has been considered preferable to avoid using the term 'news' in the Schedule. The sole criterion to determine whether a particular kind of printing paper ought to pay the lower rate of duty is the percentage of mechanical wood pulp it contains, and the purpose for which it may be used is irrelevant.
- (3) Certain kinds of printing paper, specified in the revised Schedule, remain subject to the present duties.
- (4) All writing papers and all printing papers (other than those specified) which contain less than 65 per cent. of mechanical wood pulp become subject to a uniform specific duty of one anna a lb.

2. In the course of the evidence a number of suggestions were made for the exclusion from the scope of the protective duties of various kinds of paper, and it is desirable that these suggestions should be noticed. In the first place, the following packing and wrapping papers were mentioned:—

Sulphite Envelope, Machine Glazed Pressings, Manillas, Krafts, Nature Browns and Tissues.

All these are specifically mentioned in the existing Tariff Schedule and since all packing and wrapping papers will remain subject to the present duty, it is needless to refer to them further. Similarly, some of the papers suggested for omission are not classed as printing or writing papers, and consequently will remain subject to the existing duties. These include:—

- Straw boards.
- Card board.
- Grease-proof paper.
- Gummed paper.
- Embossed Leatherette.
- Blue match paper, and
- Blotting paper.

Of these items the only one which requires a word of explanation is blotting paper. It appears from the evidence that the better grades of blottings are almost all English-made and sell at about 10 annas per lb., whereas the prices of country-made blotting paper range from 4 annas 6 pies to 4 annas 9 pies a lb. Continental blotting paper is imported in small quantities for interleaving diaries, but it is said to be inferior to Indian blotting paper and does not seriously compete with it. For this reason a protective duty on imported blotting paper is not proposed.

3. The printing and writing papers suggested for exclusion by some of the witnesses are more important and require detailed notice.

(1) *Super-calendered paper.*—Super-calendering plants have been installed both at Titaghur and Raniganj, but only the former is in use at present. Some of the witnesses complained that the quality of the super-calendered paper made in India was inferior, but there is no reason why it should not be made successfully. Super-calendered paper is imported in substantial quantities; it already competes with Indian paper to some extent, and, if excluded from the protective tariff, would probably be used in substitution for other imported or Indian papers. It cannot, therefore, be omitted from the protective duties.

(2) *Imitation Art paper*.—This paper is not made in India at present, but could be made. If it remained subject to the existing duty it would, owing to the difference in price, be imported in substitution for other papers and would then compete with Indian paper. It cannot be excluded.

(3) *Cartridge paper*.—The cheaper qualities of this paper are made by the Indian mills. The price of the better qualities is such that a specific duty of one anna a lb. will not amount to much more than 15 per cent.

(4) *Partly Mechanical papers*.—Papers containing a proportion of mechanical pulp do in fact compete with the writing and printing papers made by the Indian mills, and especially with 'badami' paper. They cannot be excluded from the protective tariff unless the percentage of mechanical pulp is 65 per cent, or more. A firm of lithographic printers in Bombay drew our attention to the fact that they imported from Norway a rough wood paper for printing the Holy Koran and that a similar paper was not obtainable in India. The c.i.f. price of the paper, which is a glazed paper, is given at £20 a ton. If that be so, the percentage of mechanical pulp must be high, and the paper probably contains more than 65 per cent.

(5) *Cover papers*.—These papers are used for the covers of school books, catalogues, journals, magazines, etc., and papers of this kind are made by the Indian mills. It is said that the quality and finish of the Indian papers are inferior, and that only a very limited variety of colours is offered. These papers have not been excluded because there is no apparent reason why the Indian mills should not be able to produce satisfactory paper of this kind.

(6) *Coloured papers*.—No good reason has been advanced for the exclusion of such papers, which are in fact made by the Indian mills. It would be unreasonable to exclude from the tariff papers of a particular kind merely because they were coloured and not white.

(7) *Litho papers*.—It was alleged by lithographic firms in Bombay that satisfactory 'litho' paper could not be obtained in India. One mill, however, does in fact supply litho paper to lithographers in Bengal. A wide variety of papers is used by lithographers and some of these bear well-understood trade names and can be readily identified, such as Chrome, Flint and Marble papers. These have been excluded. Others cannot be so readily identified, and some of them do not differ much from the paper which is used by ordinary printers. The witnesses were unable to explain how 'litho' paper—or the better qualities of 'litho' paper—could be defined for tariff purposes with sufficient precision to enable them to be excluded. For this reason it is not possible to exclude 'litho' paper from the protective duties.

(8) *Stereo paper*.—This is a highly absorbent paper not made by the Indian mills. It has been excluded.

(9) *Poster paper*.—This is a special paper which is smooth on one side and rough on the other, and can be readily identified. Its manufacture requires special plant, which none of the Indian mills at present possesses. It is better for its own purposes than any paper made in India, and it has, therefore, been excluded.

(10) *Art paper and Coated papers*.—These papers are not made in India, and are not likely to be made for many years, if ever. They are expensive—the prices ranging from 6d. a lb. upwards. The uniform specific duty of one anna a lb. will amount to 15 per cent. or less on such papers. The same considerations also apply to the expensive Bond and Bank papers.

